THE GLASS INDUSTRY

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G. C. A. REVIEWS WARTIME ACHIEVEMENTS AND DISCUSSES POST-WAR GOALS

Shipping container situation and other immediate problems are also fully covered during Annual Meeting in New York.

The Annual Spring Meeting of the Glass Container Association, originally scheduled for the middle of May but postponed in the hope of a Supreme Court decision and the clarification of problems pertaining to the shipping container situation, was finally called to order by President Heuisler Thursday morning, June 22.

It was hoped, as Victor L. Hall stated in his review of the industry's problems, that the lapse of a month's time would enable the glass manufacturers "to better define several matters of real concern to the industry."

J. Stanley Heuisler, re-elected president.

The Supreme Court, having failed to reach a final decision on the appeal in the Toledo case and having remanded it for further argument at the Fall Term, it can be assumed that a final decision will not be forthcoming at least until the end of the year.

The shipping container situation, while still the industry's paramount current problem, seems to be somewhat better defined.

Remarking on the fact that the Allied forces are now firmly established on the Continent, and without minimizing the tremendous tasks that still await our armed forces, Mr. Hall stressed the necessity for more serious consideration than has as yet been exhibited to the planning for the future. With regard to post-war planning Mr. Hall stated, under the record war operations we are all likely to be too complacent about the severity of the adjustment which may well follow the close of the war. In this connection it is our firm conviction that the industry's war record during the past two and a half years pretty clearly defines the adjustments which we must contemplate and be prepared to cope with.

These conclusions more or less outlined the discussions for the meeting concerning post-war activity. The objectives being:

1. Show the influence of the war on the industry's volume and various phases of its operation.

2. Indicate future courses of action which the war experience dictates.

While these subjects were emphasized, current war problems were not neglected. This fact was amply demonstrated by the appearance on the program of members of the War Production Board, War Food Administration and Office of Civilian Requirements. These representatives from the war agencies in Washington were Frank Britt on leave from the Foster-Forbes Glass Company, A. Lincoln Key of Hazel-Atlas, Hugh Crawford of Ball Brothers Company, Roy F. Segur, Walter C. Skuce and Lewis F. Gayner, who will return to his company Gayner Glass Works, Inc., after several months' service with the Glass Section of the Containers Branch, WPB. Mr. Gayner will be replaced by Hugh Crawford. It should be mentioned at this point that glowing tribute was paid Lew Gayner for his outstanding work while chief of the Glass Section.

The major topic of discussion concerning WPB orders and directives related to the prospects for an increased production of shipping container board. It was pointed out that while glass container production depended upon the availability of manpower to an important degree, and of course other facilities, the paper shortage poses an over-all problem to the entire industry and is not mitigated by geographical consideration, type of ware produced or any other variable factors. Mr. Hall in reviewing this phase of the industry's problems remarked that because of the stringency of the shipping container situation indications are, at the present time, that the output of many packers and bottlers will be curtailed during the last half of the year. This would naturally result in a proportionate scaling down of glass container requirements.

TABLE 1
PRODUCTION OF PAPER BOARD BY TYPES (1940-1944)

(Thousands of Tons)

	1940	%	1941	%	1942	%	1943	%	1944	%	% 1943 over 1940	% 1944 over 1940
Container Board	3,435	53.3	4,184	49.8	3,755	47.1	4,088	47.6	4,400	48.9	19.0	28.1
Folding Box Board	1,416	22.0	1,842	21.9	1,712	21.5	2,016	23.5	2,000	22.2	42.4	41.2
Set Up Box Board	899	13.9	1,239	14.7	997	12.5	829	9.7	750	8.3	—7.8	—16.6
Card Board	54	0.8	80	1.0	54	0.7	64	0.7	60	0.7	18.5	11.1
Building Board	179	2.8	761	9.1	1,052	13.2	1,064	12.4	1,100	12.2	494.4	514.5
Miscellaneous	467	7.2	294	3.5	399	5.0	528	6.1	690	7.7	13.1	47.8
Total Paper Board	6,450	100.0	8,400	100.0	7,969	100.0	8,589	100.0	9,000	100.0	33.2	39.5

TABLE 2
PRODUCTION OF PAPER BOARD BY QUARTERLY PERIODS FOR 1943 AND 1944

(Thousands of Tons)

	1943								1944			
	1st Q.	%	*2nd Q.*	%	*3rd Q.*	%	*4th Q.*	%	*1st Q.*	%	*2nd Q.*	%
Container Board	972	47.0	1,032	46.9	1,043	47.8	1,041	48.7	1,029	47.1	1,111	48.1
Folding Box Board	483	23.4	526	23.9	516	23.6	491	23.0	496	22.7	508	22.0
Set Up Box Board	215	10.4	221	10.0	206	9.4	187	8.8	183	8.3	189	8.2
Card Board	15	0.7	17	0.8	15	0.7	17	0.8	17	0.8	15	0.7
Building Board	270	13.0	277	12.6	263	12.1	254	11.9	275	12.6	289	12.5
Miscellaneous	113	5.5	128	5.8	141	6.4	146	6.8	185	8.5	196	8.5
Total Paper Board	2,068	100.0	2,201	100.0	2,184	100.0	2,136	100.0	2,185	100.0	2,308	100.0

NOTES: Paper Tonnages for 1940 through 1943 and the first quarter 1944 were obtained from the Department of Commerce and the Forest Products Bureau—WPB. The year 1944 of Table 1 and the second quarter-1944 of Table 2 were estimated by GCA.

With further regard to the more clearly defined situation relating to container board which Mr. Hall touched upon in his opening remarks he later stated that "Some consolation may be taken in the fact that recent action by the War Production Board in the form of the revised order L-317 represents the first definite approach toward the necessary control of the numerous paper uses." Later in the program data was presented by Mr. Kuni (see Tables 1, 2, 3, 4), showing the total paper board production by types for the last four years, with an estimate of the production for 1944. Table 1 shows the production of paper board by types for the period 1940 to 1944. The production of paper by quarterly periods for 1943 and 1944 to date is given in Table 2. Table 3 shows distribution by end use groups. Table 4 shows shipping container rating pattern.

As will be seen, these charts clearly indicate the percentage of paper going into container board production. It is hoped that these data will emphasize the necessity for a further revision of the various control orders so that paper uses may be channeled more equitably. It was pointed out by Mr. Hall that similar data on the usage of container board by the glass container industry indicates that a very worthwhile job has been accomplished in reducing the quantity of paper per unit of production.

In again referring to the possible curtailment in glass container demand resulting from a shortage of shipping containers, Mr. Hall called attention to the apparent falling off in demand for wide-mouth food containers for certain products, specifically those under Schedule I of Order L-103-b. Expanding on this thought, Mr. Hall pointed out that when the War Food program was being developed last year, the ability of the industry to meet the estimated requirements for wide-mouth containers due to machine limitations was questioned. Outstanding evidence that the wartime challenge to the industry was ably met is demonstrated by the increase of 87 per cent in the volume of wide-mouth food containers produced in 1943 as compared to 1941. An increase of 35 per cent for all shipments is further testimony to the industry's production ability.

After citing these facts Mr. Hall went on to state that if the present trend continues some wide-mouth machines will undoubtedly be idle beginning sometime around the third quarter of this year. Pointing to the desirability

TABLE 3
DISTRIBUTION BY END USE GROUPS

(Tons shipped expressed as a percentage)

	Government, F.E.A. and War Plants		*Food, Drug Construction*		*Civilian and all other*	
	1st	*2nd Q.*	*1st*	*2nd Q.*	*1st*	*2nd Q.*
Container Board	68.3	70.3	11.5	9.4	20.2	20.3
Folding Boxboard	18.8	21.0	59.5	57.1	21.7	21.9
Set-Up Boxboard	19.5	17.2	27.0	27.8	53.5	55.0
Building Board	52.2	52.6	41.3	44.8	6.5	2.6

NOTES: Data released through Forest Products Bureau.

TABLE 4
SHIPPING CONTAINER RATING PATTERN

(Tons shipped expressed as a percentage)

	Total Shipments of Corrugated and Solid Fibre Containers—1944			
	Jan.	*Feb.*	*Mar.*	*Apr.*
AAA				
AA-1	17.0	17.1	22.5	28.4
AA-2				
AA-2X	20.6	21.6	40.0	45.8
Sub-Total	37.6	38.7	62.5	74.2
AA-3	31.1	30.7	26.1	21.2
AA-4	14.1	13.8	4.4	1.0
AA-5	15.1	14.6	5.9	3.2
All Other	2.1	2.2	1.1	0.4
Sub-Total	624	61.3	37.5	25.8

NOTES: Rating Pattern of shipments by months released through Forest Products Bureau. 1944 per GCA Survey.

of a relaxation of the quota restriction governing the packaging and distribution of many food and drug products under L-103-b which are now denied glass containers it was further pointed out that estimated production for 1944 of approximately 98,000,000 gross is actually running at an annual rate of 105,000,000 gross. Since it was understood glass container requirements were more or less in balance with estimated production it is felt that there will be several million gross of containers which could be used to meet the demands of the nation's markets.

Turning to the influence of the war on the industry, Mr. Hall stated that "the war record of the industry would not have been possible without the understanding and wholehearted cooperation we have enjoyed, particularly during the past year and a half, from the various war agencies." The period mentioned includes the drafting of the original detailed closure order, most of the standardization orders and the glass limitation orders.

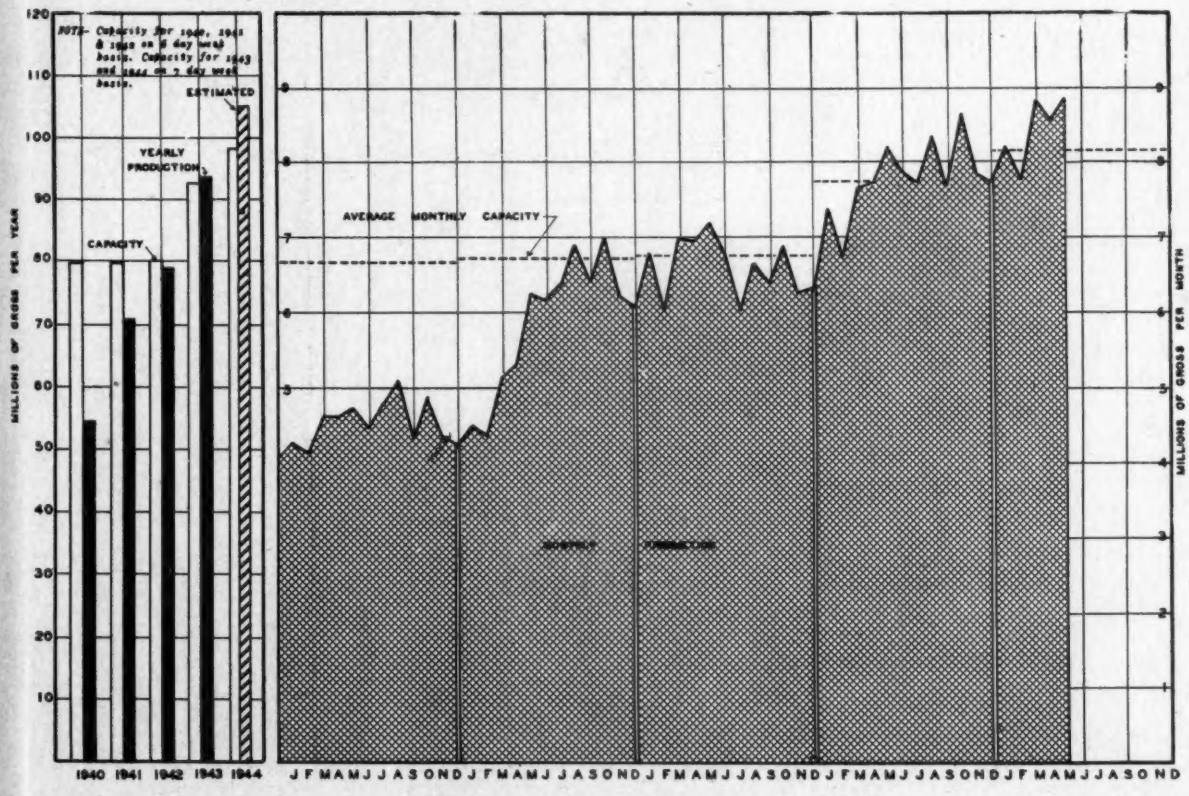
Dramatizing the glass container industry's contribution to the war effort it was pointed out that when representatives of the industry were called to Washington shortly after Pearl Harbor they learned that in line with the program of conservation of critical materials it was possible that the industry would be required to turn out the astronomical figure of 120,000,000 gross of glass containers. Although this year's current production rate of 105,000,000 gross is considerably short of that enormous figure, in considering packaging capacity, that is, the volume of products carried to market in glass containers, the industry last year exceeded the projected possibility of the 120,000,000 figure. The packaging capacity last year was two and one-third times greater than that represented by 1940 shipments. The capacity figure expressed in gallons reached the almost unbelievable total of approximately 1,795,000,000. In citing this figure it was pointed out that the multiple fillings of returnable type bottles used in the dairy, soft drink and beer industries were not taken into consideration. By adding the total gallonage reaching the consumer in these lines to the above figure it was revealed that in 1943 the per capita consumption of glass packed products was 72.3 gallons.

In summarizing his remarks concerning the influence of the war on the industry, Mr. Hall presented some pertinent thoughts with regard to basic manufacturing operations in the glass container industry. He stated, "The important phase of the record is that increased production was accomplished with a substantial per unit saving in materials, fuel, manpower and paper. For the first time, at least since the industry reached a stage of full mechanization, it has experienced a year of unlimited demand. There are a number of basic lessons to be gained during this period." These lessons Mr. Hall enumerated as follows:

1. With round-the-clock seven-day operation, probably no other industry is more dependent on volume for maximum operating efficiency than is the glass container industry.

2. Up to the present time it can be said that the capacity of the industry is elastic. Each year a greater tonnage has been pulled from a given square footage of melting area.

3. Standardization, considered in the broad sense as


ESTIMATED
YEARLY PRODUCTION
CAPACITY
AVERAGE MONTHLY CAPACITY
MILLIONS OF GROSS PER YEAR
MILLIONS OF GROSS PER MONTH
1940 1941 1942 1943 1944
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Total annual industry production compared with productive capacity and total production by months.

GLASS CONTAINER PRODUCTION COMPARED WITH INDUSTRY CAPACITY

	1940	1941	1942	1943	1944 (E)
Total Active Melting Area (sq. ft.)	107,091	105,821	106,229	106,483	110,489
Capacity (gross*)	79,847,952	79,925,145	80,499,804	92,770,393	98,275,184
Actual Production (gross)	54,470,225	70,817,198	79,182,790	93,665,657	105,000,000
% of Production to Capacity	68.2	88.6	98.4	101.0	106.8
Average Weight per Gross (pounds)	90.5	90.5	94.5	92.9	92.9
Actual Production (tons)	2,464,787	3,204,116	3,743,361	4,352,206	4,877,750
*Active Melting Area Required for 1 Ton of Packed Glass	12.2	9.2	7.9	8.1	7.5

E—Estimated.
*1940-1942 6 days per week basis—280 operating days.
1943-1944 7 days per week basis—332 operating days.

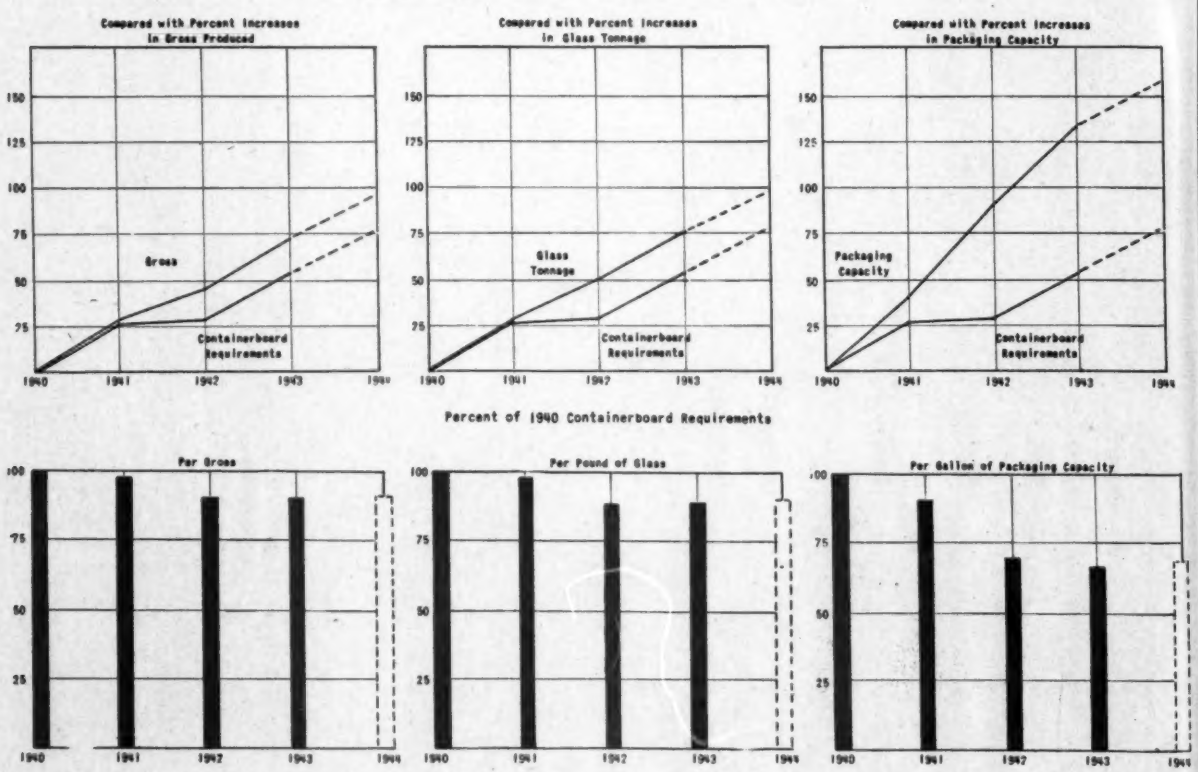
including reduction of number of items, light weighting, etc., has had a tremendous influence in bringing about improved efficiency.

4. Since the record production was accomplished under many adverse operating conditions, such as an insufficient working force, green labor, substitute fuels, etc., there is every reason to believe that with ample volume further improvement in efficiency is possible.

The matter of future courses of action which the industry might take was given considerable attention by Mr. Hall in his annual review. While concrete conclusions and detailed plans are unavailable a brief resume of this phase of the industry's deliberations should be of interest. The Post War Planning Committee which was appointed following the last Fall Meeting of the Association has, in addition to considering the broad problems before it, confirmed the recommendation of the Beer Bottle Committee covering a preliminary program for the single trip beer bottle. Data relating to the first two steps of this program were presented at the meeting by E. G. Ackerman.

During the first half of 1944 the planning committee has not been called upon to take further action due to the uncertainty with respect to the anti-trust action, a final decision on which had been hoped for from the Supreme Court. However, in anticipation of a decision toward the end of this year or early in 1945 and in considering the favorable progress in the European phase of the war it was suggested that "it would seem in order for the industry to instruct this committee regarding any desired activity."

With regard to the post-war position of the industry, Mr. Hall stated that while it is true that the glass container industry does not face the physical reconversion of plant and equipment such as will obtain in the automobile industry and many others the problem of adjust-


Percent Increases in Containerboard Requirements over 1940
Compared with Percent Increases in Gross Produced
Compared with Percent Increases in Glass Tonnage
Compared with Percent Increases in Packaging Capacity
Gross
Glass Tonnage
Packaging Capacity
Containerboard Requirements
Percent of 1940 Containerboard Requirements
Per Gross
Per Pound of Glass
Per Gallon of Packaging Capacity

Analysis of glass container production and containerboard requirements.

ment to more normal production levels will be of serious proportion.

Charts were presented showing the normal growth of the industry through the thirteen years preceding 1941 and indicating the volume which the industry would have had last year if the war requirements had not stepped up production beyond all previous consideration.

Many factors seem to preclude the possibility of an accurate opinion as to the level of operation to which the industry could return without sacrificing a considerable part of its present production efficiency.

In addition to the present standard of production efficiency it is felt that these standards will continue to improve and there is a strong belief that maximum production has not yet been obtained from present tanks.

Pointing out that container design and type, raw material prices, labor rates and working rates all have a bearing on the situation, Mr. Hall suggested that a careful analysis of operations by individual companies should be productive of valuable data in this connection.

The matter of the industry's obligations to the national economy and the employment problem were touched upon by Mr. Hall during which he pointed out that the glass manufacturers had definite obligations not only to the present workers but to the 12,000 factory employees now in the armed services.

As a means of best meeting these obligations, the maintenance of present glass container markets to the maximum extent was urged. In this connection F. P. Gass presented data on the end use of glass containers. Analysis of these statistics, it was felt, would be helpful in determining the most suitable markets in which the glassmen might invest their efforts.

A paper "Packers Service and Handling Problems" was presented by R. L. Chenry and dealt in considerable detail with problems to be solved by the industry in order to consolidate gains and provide the basis for future development.

No concrete conclusions have been reached in the matter of a broad program of consumer promotion on glass containers. The manufacture of competitive packages and price differentials are involved but guidance on the subject was offered the assembled glassmen by L. L. Rummell of the Kroger Grocery and Baking Company, in his paper "Retailers' Problem in Glass Container Merchandising."

Touching on the merchandising aspects of the single trip beer bottle Mr. Hall stated that "Since beer in the single trip bottle must compete with the beer can which has been thoroughly advertised and merchandised it will undoubtedly be necessary to put on a broad direct consumer promotional program."

The expansion of the work at the Preston Laboratories was recommended. In commenting on this work Mr. Hall emphasized the value of standard testing including research on a proper impact test which it is felt is fundamental to continued improvement in light weight design. It was further stated that cord research and the development of ring section technique have contributed to the gains in operating efficiency. Quality control, it is felt, could be effective in helping to further reduce operating costs.

In connection with the work which has for some time been carried on at Massachusetts State College it was reported that the Food Committee of the Association has requested that this work, which has been primarily defensive in character, be expanded.

With regard to the highly important matter of shipping facilities B. H. Taylor, the G.C.A.'s traffic director, reviewed the over-all traffic situation and pointed out some specific items of interest relating to the glass container industry. It is a natural concomitant that with the tremendous production of containers which has been achieved that the demands on the carrier systems would increase accordingly. For example, while data is not available on all forms of transport, carrier statistics reveal that in 1943 carload shipments of glass containers totalled 214,574 cars or 4,510,957 tons on which freight charges amounted to $33,180,039. In percentages the increase for 1943 over 1942 was 22 per cent in cars, 34 per cent in tons and 38 per cent in freight charges. Heavier average loading, in keeping with the wartime freight conservation program accounts for the higher percentage of tons than cars.

Manpower shortage is still the paramount worry of the railroads. However, it was reported that there is a slight improvement in the number of workers needed. This improvement is not apparent, however, in skilled and experienced personnel.

All officers of the Glass Container Association were re-elected for another term of one year. They are J. Stanley Heuisler, President; C. D. King, First Vice President; I. E. McDonald, Second Vice President, and H. W. Kuni, Secretary and Treasurer. Re-elected to the Board of Directors for a term of three years were J. C. Feagley, C. D. King, I. R. McDonald, O. C. Noble and R. R. Underwood.

PENNSYLVANIA SALT TO OPEN NEW DISTRICT SALES OFFICE

Word has been received from the Pennsylvania Salt Manufacturing Company that it will open a district sales office at Cincinnati, Ohio, to serve the territory including southeastern Indiana, southwestern Ohio, and the major part of Kentucky.

Louis M. Kuilema has been appointed District Sales Manager in charge of that office. He was formerly with the Paper Makers Chemical Department of the Hercules Powder Company and has been in the executive offices of that company for the past seven years.

• DeWitt Thompson, formerly assistant general manager of sales for the Mathieson Alkali Works, has been promoted to Lieut. Commander in the U. S. Naval Reserve. He joined the Navy in 1942, on leave of absence from Mathieson, with the rank of Lieutenant (s.g.) U.S.N.R.

CARE AND REPAIR OF COMPRESSED AIR EQUIPMENT

PART II

With any compressed air system a supply of clean, cool dry air is essential to the satisfactory operation of the compressors. The weight of air handled by a compressor varies inversely as the absolute temperature of the intake. If, therefore, the intake temperature could, for example, be reduced from 80° F to 60° F, the compressor will handle 3¾ per cent more capacity. If dust or foreign matter is continually sucked into the machine, it causes rapid wear of the working parts. Air intake filters are therefore fitted to all compressor intakes. These should be inspected and cleaned regularly as loss of capacity will result if the filter is allowed to become badly clogged. Cleaning is accomplished by removing the filter element and subjecting it to a jet of hot water or steam, or plunging it into a strong solution of washing soda. The filter doby should be drained and replaced. If the filter is of the oil wetted type, it should be dipped in clean medium oil and allowed to drain thoroughly before being replaced in the intake. Do not use gasoline or kerosene in cleaning air filters, as the fumes may collect and explode in the compressor or air receiver.

If a filter seems to clog too quickly it is best to check its location. Much fouling of the intake may occur if the intake line is near a stack which belches smoke, acid fumes, and harmful dust, or if the intake opens out on to a railroad line, or is near a coal or ash bin or a crushing plant. The intake should come from outside of the building where the air can be obtained as cool and pure as possible. It is often beneficial to have the air intake near the roof of the building, if the air is of better quality at that point, or on the north side of the building rather than the hot side, if convenient. The intake pipe should be turned upward so that the air is taken from at least 10 feet above the ground, to avoid sucking grit from the ground level, and it should be protected from the weather so that rain is not permitted to enter. Fig. 1.

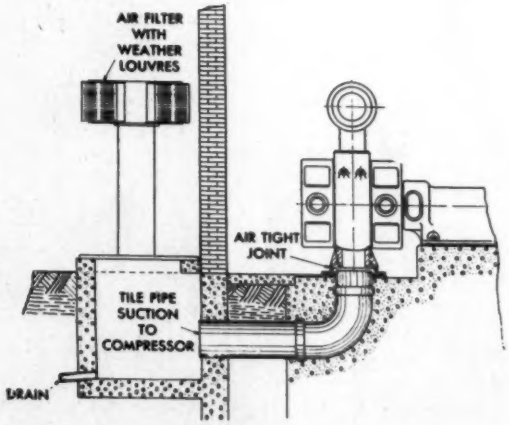


FIG. I
Courtesy Compressed Air Institute

The aftercooler should remove as much of the moisture in the compressed air as is possible at the compressor before entering the main air lines. It is obvious, however, that the amount of moisture that can be removed by the aftercooler depends largely upon the temperature of the cooling water. Therefore, the circulating water for the aftercooler should be as low a temperature as is possible for maximum moisture removal. Fig. 2.

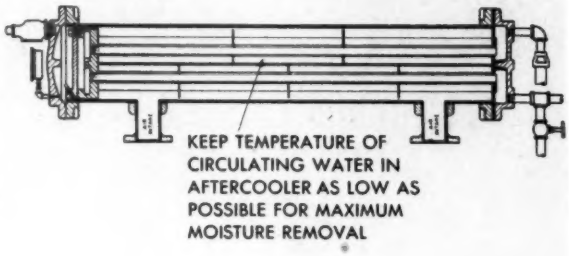


FIG. II
Courtesy Compressed Air Institute

The majority of intercoolers and aftercoolers can be inspected by breaking the air inlet and outlet connections, removing the cooler head and pulling out the tube nest. The tube nests should be inspected periodically. Any gummy oils or tarry substances which may collect on the air side of the tubes will seriously reduce the efficiency of the cooler. This can be removed by thoroughly washing the tube nests with a solution which will cut the foreign substance but will not injure the tube nests. In the case of coolers in which the air flows outside the tubes, best results will be obtained by spraying the solution over and around the tubes and, if necessary, a narrow, stiff-bristle brush may be used. The tube nest should be blown thoroughly dry before reassembling in the shell.

Leakage in the tube nests may cause trouble in two ways, (1) during periods when the compressor is secured, water may leak into the air side of the cooler and when the air flow is started again, a large amount of water may be carried over into a following stage or into the discharge line; (2) when the coolers are in operation, air may blow back into the water side displacing the water and thereby greatly reducing the cooling efficiency. If, before starting the compressor, a considerable quantity of water is drained from cooler shells, a leak is indicated and should be located and remedied.

If, during operation, a water-relief valve on a cooler blows while the cooling water pressure gauge indicates normal pressure it is evidence of a burst tube permitting the air pressure to suddenly increase the water pressure within the shell. The compressor should be secured immediately and the tube plugged. In the case of coil-type coolers, the coil should be replaced.

All air receivers have drain cocks located near the bottom which must be drained daily, or, if no after coolers are used in the system, the receiver should be drained several times per day, especially on damp humid days when the air contains a maximum of moisture. Safety valves on receivers should be tested occasionally by lifting the valve levers or by raising the pressure to that required to operate the valves, to insure them being in proper condition. Fig. 3. During overhaul periods the interior of receivers should be inspected, particularly around seams and joints. All rust should be scaled off. All scaled surfaces and all seams and joints should be given two coats of red lead.

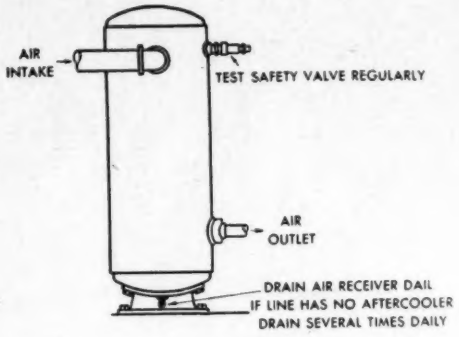


FIG. III

Courtesy Compressed Air Institute

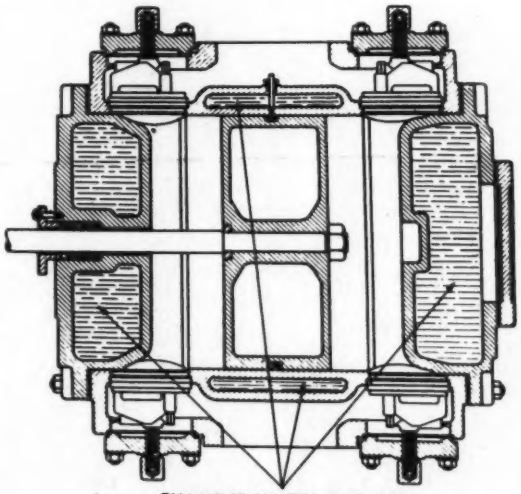
It is essential to examine the water jackets at frequent intervals and thoroughly clean them. Fig. 4. Their condition is the best evidence of the suitability of the cooling water that is being used. The presence of heavy, hard scale in the jackets forms an insulation which prevents the effectiveness of the water jackets. If the circulating water is dirty, mud will be deposited and will ultimately obstruct the flow of water, resulting in possible damage to the cylinders and pistons. A good way to clean water jackets is to use a nozzle made of ¼ or ½ inch pipe pointed at the end and as long as the water jacket. With this nozzle, a pressure jet of water can be played directly on the bottom of the water spaces and the silt and other soft deposits removed. If the scale is hard a dilute acid must be used. The acid, 10 per cent hydrochloric (muriatic) may be forced through the jackets by a small circulating pump, or by running it from a container placed above the cylinders. It is important to neutralize the acid effect in the jackets with alkali such as soda ash after the acid treatment to avoid any damage being done by residual acid.

When filling the cooling system of the compressor for the first time or after the compressor has been drained, open the water inlet valve a small amount, allowing the water to rise slowly in the cooler shells and water jackets. Vent valves to water spaces, where fitted, should be opened to permit entrapped air to escape. Such a procedure will remove all air pockets much quicker than if the water supply is at once turned on full.

Because of the multiplicity of control, regulating and unloading devices installed on various compressors, detailed instructions for their adjustment and care cannot be made. Reference should be made to the manufacturer's instruction books for information as to the method of adjustment for these devices. In general, however, changing the setting of the stop-start control on electrically driven compressors is accomplished by shifting the position of contactors on the pressure switch, and on the steam driven compressor by changing the tension on the control valve spring. Unloaders for starting purposes should be adjusted so that the compressor will not be loaded until the unit is up to speed. If the compressor loads before it is up to speed the unloaders should be readjusted immediately in accordance with the manufacturer's instructions for correcting this condition.

If a control valve fails to work properly, it should be taken apart and thoroughly cleaned. Some control valves are fitted with a filter filled with a sponge or woolen yarn to prevent particles of dust or grit from being carried into the valve chamber, and remove the gummy deposit which sometimes comes from oil used in the compression cylinders. When control valves are cleaned, replace the yarn in the filter using only genuine wool. Cotton will pack and stop the air flow.

Relief valves are very important for the safe operation of the compressor and air systems and therefore must be kept in satisfactory working condition at all times. They should be lifted by hand each time the compressor is started and should be tested periodically by raising the pressure in the spaces to which they are attached to check the setting. The proper setting of relief valves should be found in the manufacturer's instruction books for the specific compressor, on the instruction plates attached to the machine, or on the detail plans of the compressor.



EXAMINE WATER JACKETS AND CLEAN INCRUSTATIONS OFF REGULARLY

FIG. IV

Gaskets when replaced, should be the identical thickness as furnished by the compressor manufacturer to insure proper clearance between pistons and heads. This applies not only to cylinder head gaskets but to frame

(Continued on page 327)

Glasshouse Friggers

Witch Balls and Nailsea Tubes

By T. TAYLOR SEAGO

Spheres of glass, colored and plain,
Hang at the cotter's window pane,
Spinning round in the sunlit air—
Throwing their sparkle everywhere:
Gleaming, colorful and gay,
They cheer the traveller on his way.

Gone the sunlight—darkness falls—
Look once more at the twinkling balls:
The starlight's gleam is reflected there
As a warning through the clear night air;
"Powers of Evil"—come not nigh—
A magic charm hangs here on high!"

Even at the present time many of these colored glass balls are made at the glass furnaces throughout the country. Nowadays they are usually self-colored, relying upon the beauty of their own form and tint for their appeal.

When glassmaking flourished at Nailsea, however, in the 18th century, these balls were made in a multitude of tints with varied forms of decorations, such as colored and white spiral threads, air-thread spirals or with four or more groups of colored loops, hanging like festoons over the surface of the ball.

The superstitious folk of that time were accustomed to hang these balls outside their homes as a charm against witchcraft and the like. Hence their romantic name. Another and more practical use for which these balls were employed was as a closure for wide-necked containers such as jugs, pitchers and bowls, to keep out the dust. A colleague of the writer uses a similar article at the present time for exactly that purpose.

The looped variety was made as follows. The worker would first blow a smallish sphere of glass and his assistant would then wrap round it a thread of softened glass of a different color, encircling that ball a number of times, spacing the spiral as he went along. With his tool, the maker would drag the threads at four equidistant points around the ball, thus forming four sets of loops. He would then re-heat the whole in the pot mouth and would blow the article to its finished size when the glass was sufficiently softened, and when the applied threads had merged somewhat into the body of the sphere.

Spirally threaded balls were made in a similar way, but here the threads of soft glass would be placed on one at a time, the maker slightly rotating the ball the while. These threads were laid on longitudinally (not laterally as for the loops). They could be further twisted on reheating, perhaps being covered with another layer of transparent glass, colored or white.

These White Balls were blown in many sizes, those used as charms being six or more inches in diameter.

The same Nailsea men, according to Mr. N. Hudson Moore, the American writer, had another quaint custom. They would keep standing in their homes a tall glass rod or tube, varying from three feet in length upwards. This, they supposed, had the power of holding any of the elements of ill health or disease which had gained access to the house. Each morning the tube was religiously wiped to remove these harmful elements and to preserve the health of the family. Presumably these tubes and rods were made of plain glass or with spirally twisted threads.

WHAT GLASS MANUFACTURERS SHOULD KNOW ABOUT VETERAN REHIRING

By O. C. COOL
Director, Labor Relations Institute

Unlike so many employers in the war production industries, glass manufacturers can ponder the veteran rehiring problem without concern for cutbacks. I think it is generally held throughout the glass industry that the postwar period will be one of expansion rather than contraction, and there certainly is no question about the ability of the industry to absorb its returning veterans.

Notwithstanding this general statement, however, it behooves glass manufacturers to acquaint themselves in detail with their obligations under Section 8 of the Selective Training and Service Act, the purpose of which is to insure certain basic rights to the original, permanent employees who left their jobs to join the fighting forces. The most important clause in Section 8 provides that an employer *must restore* a regular employee *to the same* position, with like seniority and pay, unless the employer's circumstances have so changed as to make it "impossible or unreasonable" to do so.

According to a recent poll, 70 per cent of the men in the armed forces expect to get their old jobs back when they return from the war, and they believe that their right to the jobs is assured by the law. But a great many of these individuals actually are not covered by the statute. They were not "regular" employees when they entered the service: they happened to be replacements of other men who were inducted at an earlier date. In these days of manpower stringency, when so many workers have been inducted, or have shifted to "essential" jobs under WMC pressure, every employer has jobs which have been filled by a steady succession of employees—and quite a few of these now are soldiers and sailors. It is more than theoretically possible for 9 or 10 returning veterans to show up at the close of hostilities and demand the same job. In fact, with so many troops being weeded out in favor of younger men, the procession has already begun.

The following questions and answers were prepared by the Research Staff of the Labor Relations Institute to guide employers in protecting the true rights of the employees who come back for jobs, and also in avoiding mis-steps which may lead to misunderstandings and possible litigation.

Q. What conditions must the veteran fulfill in order to be eligible for his old job?

A. (1) The ex-soldier must have an honorable discharge certificate which records his service with the armed forces. (2) He must be qualified to perform the duties of his old position, and (3) he must apply for reinstatement within forty days after his discharge.

Q. Does the law apply to those who have volunteered for service?

A. Yes, it applies to volunteers, as well as to those who have been drafted. It covers officers as well as enlisted men. The Act makes no distinction between male or female personnel, so Wacs, Waves, Marines and Spars have the same re-employment rights as the men.

Q. Does the law cover ALL employees who have been inducted into the armed forces?

A. This is a key question which has not been totally answered, and which probably will undergo considerable clarification. The wording of the law grants reinstatement to the soldier who left "other than a temporary position."

Q. Does this mean that a replacement who gets drafted has no protection under the law?

A. Correct. The only employee whom the employer is *obliged* to reinstate is the *first* man or woman who held a given job before entering the service. Any worker subsequently hired to replace the inductee was only a temporary employee and is not entitled to protection under the provisions of Section 8.

Q. Does the above still apply if the employer failed to tell the replacement that he was on a temporary or "duration" job?

A. Failure to inform the worker that he has replaced an inducted employee does not change the meaning of the regulation.

Q. What if a replacement returns from the army before the original draftee? May the employer hire the replacement until the original worker returns?

A. Under current interpretations, by government officials, the employer may rehire the replacement, but must discharge or transfer him if the original worker reapplies for the job.

Q. *Must* a veteran be returned to his old job?

A. Yes.

Q. What if the job no longer exists?

A. Selective Service officials hold that in such situations the service man must receive a job of *like pay* and with full seniority status.

Q. What if the veteran is not qualified to fill another job?

A. Here again draft heads maintain that the veteran must be given the opportunity to train for a job requiring skill similar to that of the one he left.

Q. What if the wage for the veteran's job has been increased during the time he was in service? Does he receive his former pay or the new rate?

A. He is entitled to the new rate. On the other hand, if the job has been reevaluated and a lower rate is now in effect, the veteran is not required to take it. He need not take any position which pays less than he earned when he left to be inducted. In such cases the employer is obliged to provide a job which DOES pay the higher rate.

Q. Does the original employee accumulate his seniority while in the service?

A. Yes, according to government officials, the veteran must receive all the benefits which would have accrued to him had he not been drafted. These include such benefits as pension and retirement plans, profit sharing, group insurance, hospitalization, etc., even if they were installed AFTER the worker was inducted.

Q. If during the veteran's absence from the company, the employer signed a closed shop agreement with the union, does the returning veteran have to join?

A. No, because there was no such obligation when he left for the service.

Q. If a union contract compels the employer to fire workers who do not join the union, must the reinstated employee be discharged?

A. No. Public law supersedes any private agreement made between a union and an employer.

Q. If an employer has a union hiring clause in his contract, must the veteran apply for his old job through the labor organization?

A. No. He can apply for reinstatement to his job without recourse to the union.

Q. Must a veteran submit to a check-off?

A. Only if a check-off was in effect at the time he was inducted.

Q. Does the re-employment provision of the Act cover employed veterans who never worked for your company before?

A. No. Such former soldiers have the same status as new employees.

Q. From what date does the veteran's pay start?

A. His pay begins on the day he applies for his old job. If, because of transfers and other complications, it takes some time before he can start working, the veteran must be paid for the days he was kept waiting.

Q. Has the employer any recourse if he disagrees with the veteran over the latter's reinstatement rights?

A. Yes. He may refer the disagreement to the re-employment committeeman of the local draft board, who will help to straighten out the tangle. Decisions of committeemen may be appealed to the State Director of Selective Service.

Q. What recourse does the veteran have in case of dispute?

A. He is entitled to go to the Federal District Attorney and bring suit. His case will be automatically advanced on the court calendar, and the employer found guilty will be assessed back pay and all benefit payments accruing.

Q. Is there a criminal penalty for non-compliance with Section 8?

A. Yes. The Act provides for imprisonment of not more than 5 years or a fine of not more than $10,000 or both.

Q. Must a veteran make a written application for re-employment?

A. No. Informal application within 40 days after discharge is considered sufficient.

Q. Can the rehired veteran be fired?

A. No. He cannot be discharged without cause for a period of one year after he has been rehired. The words "without cause" have not been defined by the government, but the general intent of the regulation is that the veteran should not be discriminated against and discharged on flimsy excuses. The burden of proof will lie with the employer.

Actual court decisions are beginning to appear on many points raised by actual cases under Section 8. Moves are on in Congress to further define and liberalize the returning veterans' rights, and the various bureaus and agencies concerned with the problem are also issuing new regulations and opinions. It will pay every glass manufacturer to keep informed of these changes, both for his own sake and for those of his former employees now in the armed forces. Public relations, as well as labor relations, are involved. It is impossible to be too well informed on such a question.

NEW ORDER L-317 OMITS UNLIMITED QUOTA FOR TUMBLERS

The unlimited corrugated box quota formerly applying to tumblers, not stemmed, footed or cut, which prevailed by reason of a special amendment to the original order L-317 has been at least temporarily lost since the issuance of the new order L-317 dated May 29, 1944.

It has been found after checking the status assigned to tumblers under this new order that the unlimited quota provision has been omitted. However, it is understood that the industry is making the necessary effort to have the new order interpreted or amended so as to obtain the unlimited quota arrangement formerly enjoyed.

PRIORITY REFERRAL PLAN FOR LABOR

Localized administration of new plan of great significance where glass manufacture is of dominant importance in an area.

Beginning July 1, 1944, no employer of more than eight workers, regardless of the essentiality of his business, may hire a *male* worker unless such worker presents a "Referral Card" from the United States Employment Service. This card should not be confused with a Statement of Availability.

If a male worker is hired from a non-essential activity, under the regulations of this new labor control plan, a Referral Card is required, but in such case a Statement of Availability is not. However, if the worker comes from essential activity both the Referral Card and Statement of Availability are mandatory.

Female workers, whether engaged in essential or non-essential activity, are exempt from the use of Referral Cards. However, if a female worker has been engaged in essential work then a Statement of Availability is necessary.

Employment Ceilings

For purposes of administration, the War Manpower Commission has divided the United States into 12 geographical regions, each comprising one or more entire or sections of states. Each state or section of a state is subdivided into areas, including all territory within approximately a fifty mile radius of the principal city in the area. For example, of importance to glass manufacturers is West Virginia which has six areas. These are: Charleston; Clarksburg-Fairmount-Morgantown; Huntington, West Virginia-Ohio-Kentucky; Parkersburg, West Virginia-Ohio; Point Pleasant, West Virginia-Ohio; and Wheeling, West Virginia-Ohio.

The War Manpower Commission classifies labor areas from all states into groups according to the labor supply within them, as follows: Group 1—Acute labor shortage; Group 2—Labor stringency; Group 3—Slight labor reserves; and Group 4—Substantial labor reserves.

Glass factories located in areas classified into Groups 1 and 2 will have employment ceilings set for them by the WMC area director in which the company operates. The area director, however, will work in cooperation with and advised by an area Manpower Priorities Committee. This committee is composed of local representatives of WMC, WPB, Army, Navy, Maritime Commission, Selective Service, and other war agencies operating in the area.

A company's employment ceiling is the greatest number of employees or the greatest number of specified types of employment which a company is prohibited to exceed. This number is set for a specified time, 60 days to 6 months, and is based on an approved and necessary production schedule. If the company's production schedules change, the committee is at liberty to alter the ceiling.

In addition to working with the War Manpower Commission on setting employment ceilings, the area Manpower Priorities Committee determines which employer should receive highest priority for labor within his area and also establishes the priorities sequences which the USES must follow in referring workers to these various establishments in their area. It is generally believed that Manpower Priorities Committees will function only in areas in Groups 1 and 2, WMC and USES officials will operate the plan in all other areas where committees are not convened.

Acceptance or Rejection of Employees

As an employer, it is not compulsory to hire a worker referred to you; nor does the worker who has been referred to you have to accept the job. However, if a worker continually rejects jobs to which he has been referred by the USES without reason, future Referral Cards can be withheld. On the other hand, an employer who habitually does not hire without sufficient reason will not have workers sent to him for employment.

The USES will refer workers to non-essential work only when there is (a) no need for essential work in the area, (b) when the person applying for a job cannot accept essential work outside the area if there is no essential work within the area, or (c) when he cannot accept an essential job because of an undue personal hardship.

The USES may approve hiring through a labor union. However, glass manufacturers should ascertain at once whether or not the particular union in their plants is to be a hiring channel within the area in which they are located.

In connection with the factor of individual determination with regard to acceptance of a job or employment either by the worker or the employer, it is interesting to note that the most recent statement from the WMC emphasizes the non-compulsory nature of the plan. Further, it is pointed out that it is the policy of the WMC and USES to direct workers to jobs for which they are best fitted and where wages are not lower than those which they have been getting. In other words, workers will be given maximum freedom of choice in the jobs they accept and the same freedom will apply to employers, all consistent, however, with war requirements.

Another important statement amplifying the original release from WMC concerns the worker's right to reject a job which would require him to join a labor union, change his affiliation with one or refrain from joining a labor organization.

It is further understood that it is the intention of the local boards to avoid sending workers out of areas where the depletion of manpower in a locality would work undue hardship on a municipality. This should be of particular interest to glass plants located in towns where the plant is the major industry and supplies most of the employment.

It is highly desirable that glass manufacturers consider at once the proper procedure to be followed in

(*Continued on page* 324)

INVENTIONS AND INVENTORS

A Summary of United States Patents of Interest to the Glass Industry Issued During May

Feeding, Forming and Shaping

Paul R. Luertzing of Vineland, N. J. received patents 2,350,052 and 2,049,046 for means of centrifugally forming cylindrical containers open at both ends, shaped to receive end closures, and having a uniform internal diameter. Each of these patents and apparently a third invention represented by application 353,951 employ a partable mold rotated at such a speed as to cause a rapid flow of the glass charge against the forming surfaces of the mold. The mold surface may give the ware any desired configuration. The second of these patents is particularly directed toward methods of re-shaping the inside of the cylinder. This would be needed only if some imperfection was noted or if it was intended to impress a design upon that surface. These results are accomplished by inserting a roller into the cylinder which serves to shape its inside surface. These patents were assigned one-half to Walter O. Luertzing of Vineland.

Patent 2,348,823 granted to Andre G. C. Kircheim of Aix la Chapelle, Germany, and held by the Alien Property Custodian, covers a method of making glass blocks in which the two-pre-formed half-sections are shaped with ribs of thin cross section on the joining edges so that they may be easily fused to complete the seal. Another patent for block joining methods is 2,349,739 assigned to Owens-Illinois Glass Co. by Harry M. Louden and Cecil W. McCreery of Muncie. It is concerned largely with apparatus which will press the heated half-sections together by means of a motor and then maintain the pressure for a period independent of the motor. This requires a locking pin to hold the work-pieces together, and automatic means of making it lock and finally release.

Bernard H. Koob of West Hartford, Conn. (Hartford-Empire Co.) received patent 2,348,347 for a machine which manufactures jars, bowls and tumblers by blowing hollow blanks to final form in a paste mold, while providing relative rotation between the mold and the blank or parison during the blowing operation.

Earl R. Rehfeld of Chicago is the inventor of the apparatus shown in Fig. 1 for permanently attaching sealing straps to glass bottles at the time they are being blown. This is patent 2,349,197 and the seal itself was disclosed in earlier patents 2,213,932 and 2,255,570. Rehfeld utilizes standard container machines but provides recesses in the mold sections for receiving the sealing strap. He also provides the apparatus by which the strap is fed to the mold section from a supply source. The straps are provided with two openings and the mold has enlarged openings in registry with and behind the openings in the strap. Therefore during the blowing operation, as the bottle wall is formed, part of the glass is forced through the openings in the sealing strap and caused to expand in the mold openings, so that rivet-like projections permanently fuse the strap to the wall of the bottle. Subsequent blowing and bottle removing operations remain exactly the same. In the illustrations comprising Fig. 1 the upper drawings from left to right show a mold segment with the strap in place and a view of a sealed bottle neck. The lower figure illustrates the apparatus which feeds the strap to the mold segment from a supply roll 105.

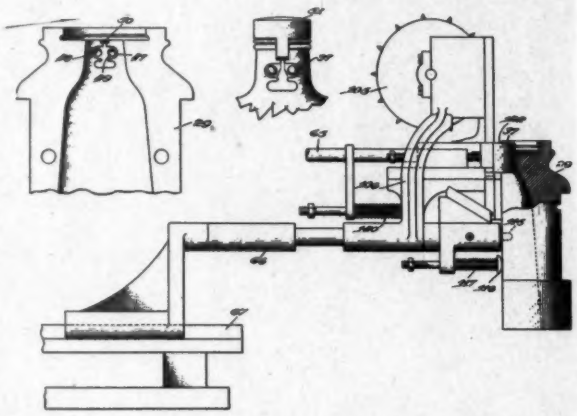


Fig. 1. 2,349,197 : Rehfeld. Closure straps for bottles are fed to recesses in the mold so that they will be permanently united to the bottle when it is blown.

Miscellaneous Processes

Peter Synek of Jackson Heights, N. Y. received patents 2,348,035 and 2,348,036 for apparatus and processes for making glass beads. The beads are formed around a wire which is moved horizontally and intermittently past a station where a glass rod is heated by a gas flame so that its plastic tip flows onto the wire to form a bead. The wire then advances so that another bead may be deposited. After the beads have been cooled they may be removed from the wire in any suitable manner, as by stretching the wire so as to reduce its diameter.

Contributions to lamp making art were contained in patents 2,350,220 to John Ehret Jr. of Trenton, N. J. (Western Electric Co.), and 2,349,822 to R. M. Gardner of Swampscott, Mass. (Sylvania Products Co.). The first of these concerns a chuck unit for a stem making machine, and the other deals with a lamp sealing device.

In patent 2,348,704 Frederick W. Adams of Pittsburgh and the Pittsburgh Plate Glass Co. describes acid treatments for reducing the light reflection from glass surfaces. While this general idea is not new, Adams modifies the procedure by first using nitric acid to dissolve alkalis and leave a silica enriched layer which is then treated with hydrofluoric acid to give the final result. Typical accomplishments are shown in Fig. 2 where acid treating time is plotted against an arbitrary scale of reflectance units. These particular data are based on a barium crown glass which was treated with 0.5 normal nitric acid to reduce reflectance from 6.2 to about 3.5

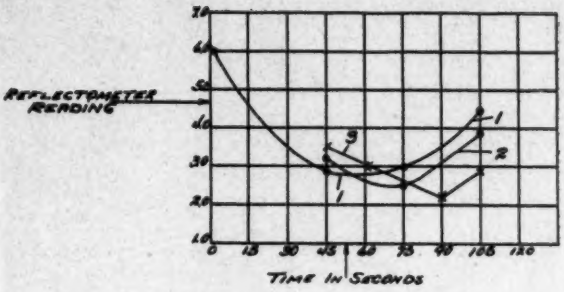


Fig. 2. 2,348,704 : Adams. Reflection from glass surfaces is decreased by successive leaching in nitric acid (curve 1) and hydrofluoric acid (curve 3).

(curve 1), and then for a similar period with dilute hydrofluoric acid to reduce reflectance further to 2.2 (curve 2). Apparently the process does not work if only a slight treatment with nitric is used, in such instances the hydrofluoric actually increasing reflectance. Like other workers in this field Adams utilizes color changes to judge when the initial acid treatment has been sufficient. The development of the leached film is indicated by the appearance of a bluish coloration, and reflectance from the surface is at a minimum when the color becomes bluish indigo.

Sheet and Plate Glass

Two types of apparatus for bending one or more sheets of glass are described in patents 2,348,278 and 2,348,279 by Edgar R. Bowles and Clarence M. Pattison of Hartford City, Ind. (The Johnston Glass Co.). One modification is shown in Fig. 3 in which a sheet of glass, originally in the position indicated by dotted lines was heated until it conformed with the curved molding surface. The latter surface is of thin heat resistant metal. Since the left hand portion of the sheet remains flat and is not intended to bend it is desired that it shall be kept somewhat cooler than the portion intended to bend and for this purpose heat shields made of asbestos millboard are positioned above and below the sheet at 23 and 25. After the bending is accomplished the unit is promptly cooled so as to prevent surface marking which would result from the nature of the apertured support 17.

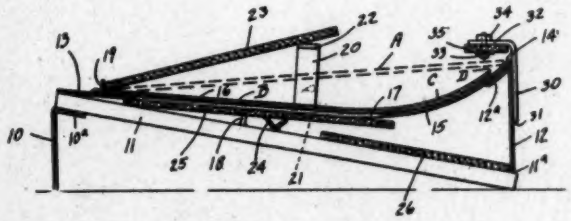


Fig. 3. 2,348,278 : Boyles and Pattison. Bending frame for glass sheets.

John L. Drake of Libbey-Owens-Ford Glass Co. also received a patent, 2,348,887, for methods of bending glass sheets. His invention is applied to tempered sheets and is intended as an integral step in that process. The sheets, heated for tempering, are moved continuously on rolls which carry them in a horizontal position to a further section of rolls arranged relative to one another so that their upper surfaces define a radius of curvature which corresponds to the curvature to be given the sheet. Being softened the sheets will tend to assume this shape but they are further urged by a pressure roll placed above the conveyor rolls. Having been suitably shaped the sheets are next cooled by air blast to provide the final tempering. Sheets tempered by such a process, wherein they are not suspended vertically, would have no tong marks. There will be some interest in noting that this patent application was filed about six years ago.

There is quite a trick to heating the center of a cold sheet or plate of glass so as to shape it into the form known as a "bull's eye." In reporting that he has found a successful way of doing it, John J. Hopfield of Toledo (Libbey-Owens-Ford, 2,348,905) points out that in normal attempts to heat a relatively small area to softening temperature with a torch or blowpipe the stress set up in the glass causes it to rupture with some little violence. He has found that the bull's eye can be produced if the heating is first confined to a relatively small spot which is not enlarged until this spot is softened enough to allow it to absorb some of the stresses which otherwise would cause breakage. Hopfield's method is illustrated by Fig. 4 (on page 324) in which the shield 15 confines the torch flame to a small spot. This area is enlarged by the removal of the auxiliary shield 8, to provide a larger softened area.

Frederic B. Waldron of Prescot, England, relates in patent 2,348,581, (Pilkington Bros. Ltd.), the damage resulting from the occasional cracking or breaking of the sheet of glass comprising a continuously formed strip. In the processes of grinding and polishing a continuous strip of glass in which both surfaces are ground and polished simultaneously, it is of the utmost importance that the occurrence of a crack in the glass should be ascertained within a very short time. If a length of glass following a crack is allowed to reach a pair of grinding tools, the glass is broken up and a considerable quantity is wasted. Similarly the polishing felts are damaged by the sharp edges of the glass.

The main object of Waldron's invention is a device whereby an operating tool in the vicinity of a crack may be raised, either manually or automatically in the shortest possible time after a crack has started.

He reports that the cracking of a strip of glass in a grinding and polishing apparatus emits a noise consisting of a damped wave train of short duration of frequencies higher than those in the bulk of the general noise of the grinding apparatus, but that this general noise does contain continuous waves of the same frequencies, but of lower intensity. Waldron utilizes these sound waves by providing an automatic device for raising the tools as soon as a crack develops and by its noise operates a low inertia microphone device which when set in vibration emits an electrical impulse to a relay. The sensitivity of the device is such that it does not respond to the low intensity sounds accompanying normal operation.

Glass Wool and Fiber

Patents assigned to Owens-Corning Fiberglas Corp. include 2,350,011 to Henry R. Black of Toledo for a de-

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GJ Research Digest

Practical Interpretations of Glass Technology

ASTM Committee C-14 Work on Glass and Glass Products

The May, 1944, *Bulletin of the A.S.T.M.* reports on the activities of Committee C-14 as follows: "At its meeting on April 5 in Pittsburgh, Committee C-14 on Glass and Glass Products reviewed a number of phases of its work and received reports of several of the sub-committees including one covering nomenclature and definitions where the most perplexing problem has been to reach agreement on a sound technical definition of the term 'glass.' Legal aspects of such definitions are being considered.

"In the work on chemical properties, three proposed methods for determining chemical durability have been drafted and they are being referred to other sub-committees on glass containers and pharmaceutical containers for consideration and approval; the latter is to use the methods in a round-robin survey among several laboratories. The first method covers chemical durability of glass used for the manufacture of glass containers in which glasses of the soda-lime type are crushed and subjected to attack by water or dilute acid at 90° C; the other two tests relate to chemical durability of glass containers, in the first of which glass containers of the soda-lime type are filled with water or dilute acid and subjected to a temperature of 120° C in an autoclave, and in the second test the containers are subjected to a temperature of 90° C.

"One problem in the work on glass construction block and tile is to coordinate different ideas on standard test methods and specifications. It is possible that agreement can be reached on testing individual units, but there are further problems involved in testing structural units made up of blocks.

"Another activity involves glass containers where the ring section methods of examining glass containers for cords as worked out by the Glass Container Association is being considered as a tentative method for A.S.T.M.

"In order to develop standardized specifications for flat glass the sub-committee in charge is reviewing existing specifications with the thought of agreeing on a standard. One project on which the committee had planned to undertake work was the effect of explosive forces on flat glass but this is being, temporarily at least, held in abeyance because of the favorable progress of the war effort."

Some Notes on the Design and Efficiency of Glass Furnaces

A comprehensive summary of a paper on Glass Furnace Design given by W. A. Moorshead before the North-Western Section of the Institute of Fuel at Manchester, England, appears in the April, 1944, issue of *Glass*.

In discussing insulation it was the speaker's opinion that the effect of insulating the regenerators and ports was hardly noticeable on the amount of fuel consumed. Insulation of the crown, however, results in a savings of about 12 per cent. A recommended method of insulating the crown was: 1—A layer of loose old silica bricks laid on top of the silica crown, sand being brushed into the crevices to form a gas seal and also a buffer between the silica crown and the insulating material. 2—On top of the first layer or course of old silica brick a layer of high temperature insulating brick is placed. Once more sand is brushed into the crevices and this completes the seal. 3—The third insulating layer or course consists of a layer of good quality low temperature insulating brick.

Mr. Moorshead indicated that it was not unusual to find that a furnace is larger than necessary, even for peak loads and that this is a direction in which considerable economies can be effected, by reducing the melting and superstructure areas, the "no load" heat requirements increasing considerably with the area of the furnace. (American practice in many cases is to run the furnace at or over the peak load.)

In the case of regenerators the features of design which would appear to lead to the best results are: 1—Ample height in relation to cross section, in order to give the greatest velocity for a given time of contact and to provide a good hydrostatic head for the air supply. For a given regenerator volume the height should be the maximum in the space available, and in any case sufficient to give an hydrostatic head of at least 0.2 inches w.g.; 2—There should be straight through passages of 3½ to 5 inches square to avoid the effects of slagging; 3—There must be ample space above the packing to allow an even distribution of gases through the checker work—1¼ to 1½ cu. ft. of space per cu. ft. of hot gases. In other words, a time of from 1¼ to 1½ seconds should be allowed in the top of the regenerator before the gases enter the checker work.

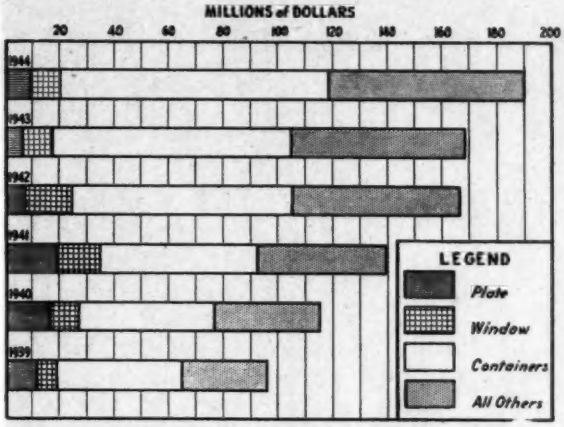
Numerous experiments have been tried out in connection with the general principles of operating furnaces. Among those which have given positive results are: 1—Lowering the furnace temperature to the minimum. In some cases this reduction has been as much as 50° C without in any way spoiling the product. There is evidence to show that in the past furnaces have been operated at temperatures in excess of those really necessary, with a consequent increase in fuel consumption. 2—Increasing the pressure inside the furnace by lowering the chimney dampers and forcing the combustion air in, where this has been found necessary. By increasing the pressure from 0.05 inches w. g. to 0.2 inches w. g. an improvement in the fuel consumption has been obtained. There are two possible explanations for this improvement: (a) the heat loss due to air leakage *into*

(*Continued on page* 328)

CURRENT STATISTICAL POSITION OF GLASS

THE GLASS INDUSTRY'S INDEX

Production: Four Months, January Through April



During April activity in the glass industry remained at the same level as that shown for March. As reported by the Production Index, output for April was $48,000,000 as compared with $43,000,000 for April a year ago. During the first four months of 1944 glass production totalled $190,000,000 as compared to $169,000,000 for the same period of 1943—an increase of slightly over 12 per cent.

Plate glass production during May totalled 9,390,617 sq. ft. as reported by the Hughes Statistical Bureau. This was an increase of 15 per cent over the previous month, and also an increase of 60 per cent over production shown for May, 1943. A total of 41,898,337 sq. ft. has been produced during the first five months of 1944.

Glass container production for May totalled 8,865,739 gross, according to the Glass Container Association of America. This was an increase of 3 per cent over April, and of approximately 8 per cent over May of 1943. During the first five months of 1944 glass container production amounted to 42,301,895 gross, as compared to 37,319,899 gross for the same period of last year—an increase of about 12 per cent.

Shipments of glass containers during May increased very slightly over April and about 4 per cent over May, 1943. Total shipments reported for the first five months of this year were 41,058,522 gross—an increase of a little more than 5 per cent over the first five months of 1943.

Inventories on glass containers for May were 4,709,931 gross—slightly less than reported for April and a decrease of 15 per cent from last year's level for May.

Automatic tumbler production during May totalled 5,912,122 dozens, an increase of 7 per cent over the preceding month and of 19 per cent over May, 1943. Shipments of automatic tumblers during this month totalled 5,850,840 dozens, an increase of 20 per cent over April this year and 27 per cent over May of last year. Finished stocks on hand at the end of May were reported at 7,600,059 dozens.

Table, kitchen and household glassware: Manufacturers' sales of machine-made table, kitchen and household glassware for May were reported at 2,311,305 dozens, a decrease of 29 per cent from May, 1943.

Miscellaneous glass products manufactured in April were estimated at $17,000,000—5 per cent less than in March. This is an increase of 6 per cent over April, 1943.

Employment and payrolls: The number of people employed in the glass industry during April were 92,600.

GLASS CONTAINER PRODUCTION AND INVENTORY

(All Figures Are in Gross)

		Production May 1944	*Stocks May 1944*
Foods: Medical & Health Supplies; Chemical, Household, Industrials; Toiletries & Cosmetics	Narrow Neck	2,595,116	1,666,629
	Wide Mouth	3,018,721	1,450,626
Dairy Products		251,820	372,985
Home Canning		470,204	378,786
Beverages		652,020	260,708
Beers		991,814	122,676
Liquors		543,084	331,209
Wines		260,986	99,057
Packers Tumblers		81,974	27,255
Total		8,865,739	4,709,931

GLASS CONTAINER SHIPMENTS

(All Figures Are in Gross)

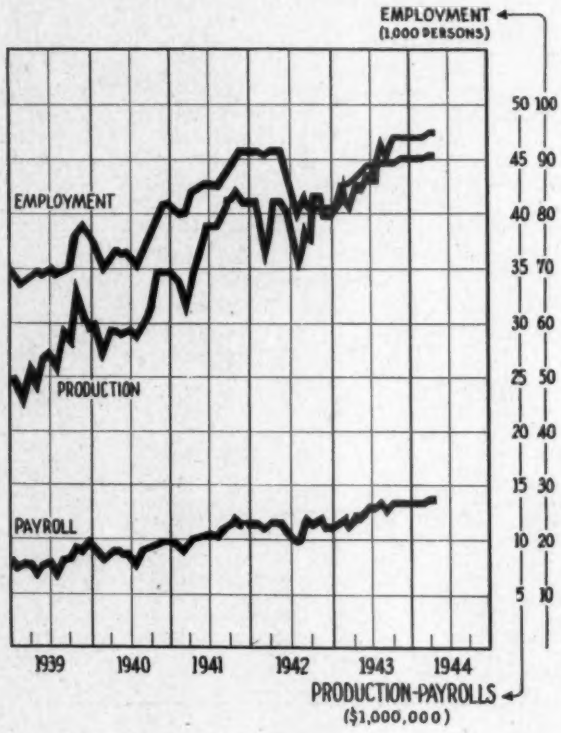
Narrow Neck Containers	*May 1944*
Food	551,721
Medicinal and Health Supplies	979,566
Chemical, Household, Industrials	674,307
Beverages	679,272
Beers	981,601
Liquors	518,475
Wines	266,167
Toiletries and Cosmetics	428,879
Sub-Total (Narrow Neck)	5,080,078
Wide Mouth Containers	
Foods	2,320,880
Dairy Products	239,129
Home Canning	394,266
Medicinal and Health Supplies	251,872
Chemical, Household, Industrials	240,285
Toiletries and Cosmetics	145,223
Packers Tumblers	94,123
Sub-Total (Wide Mouth)	3,685,778
Total shipments	8,765,856

This compares with 86,000 employed in April of last year.

Payrolls during April were estimated at $14,000,000—the same as reported for March. This is an increase of 12 per cent over April, 1943. During the first four months of 1944 glass manufacturers have paid approximately $55,000,000 in salaries.

GI THE GLASS INDUSTRY'S INDEX

Monthly Trends Through April, 1944



UNIVERSITY OF ILLINOIS GRANTS DEGREES

Announcement comes from the University of Illinois of degrees awarded in June to three men in the glass and ceramic fields.

C. H. Commons, Jr., was granted the Professional Degree of Ceramic Engineer. Mr. Commons graduated from the Department of Ceramic Engineering in 1929, was formerly with the Titanium Alloy Manufacturing Company, and is at present with the Army Ordnance Division. The award was based partially on outstanding work done for the Ordnance Division and also on other papers submitted as thesis material.

Two Bachelor of Science degrees were granted—one to Raymond Moore, who is employed by the Corning Glass Works, and one to Gordon H. Johnson, who is doing special research work in the Department of Ceramic Engineering.

Attention . . .

Glass Tank Operators

***For Maximum Life* SPECIFY**

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CAST SUPER REFRACTORY

For

Mantels, Feeder Parts, Tuckstones, Burner Blocks, Port Covers, Port Bottoms, Port Arches, Port Skews, Port Baffles, Lintels, Jambs, Bridgewall Covers, etc.

C.S.R. *has excellent resistance to*

HIGH TEMPERATURES
CORROSION
SHRINKAGE
SPALLING

C.S.R. *is*

VACUUM CAST
ACCURATE TO SIZE
UNIFORM TEXTURE
ECONOMICAL

Write for Full Particulars

WALSH REFRACTORIES CORP.

High Grade Refractories for Over 50 Years

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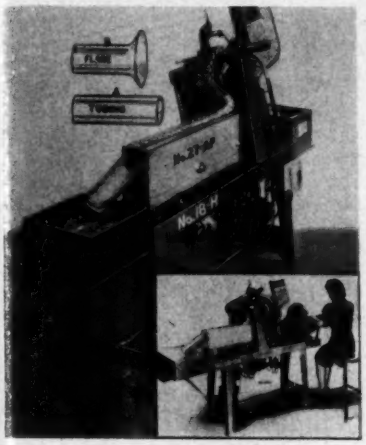
NEW EQUIPMENT AND SUPPLIES

AUTOMATIC HIGH SPEED FLARE MACHINE



A motor-driven automatic Flare Machine, especially developed for uniform and increased output, has just been placed on the market by the Eisler Engineering Co., Newark, N. J.

The following brief description with the accompanying photograph characterize the advanced features and improved function of this new machine.

The substantial construction consists of a slotted wheel, maintained in intermittent motion by an indexing mechanism, carrying in its grooves the glass tubes, which are automatically dropped in by a properly placed Feed Hopper. An endless chain, rotating counterclockwise keeps the tubes continually revolving at suitable speed, by pressing them slightly against a disc, that rotates clockwise inside the slotted wheel. During the course of continuous rotation (at approximately 120 RPM) the ends of the revolving tubes are adequately heated by ribbon burners, mounted properly beneath the tubes aside of the wheel.

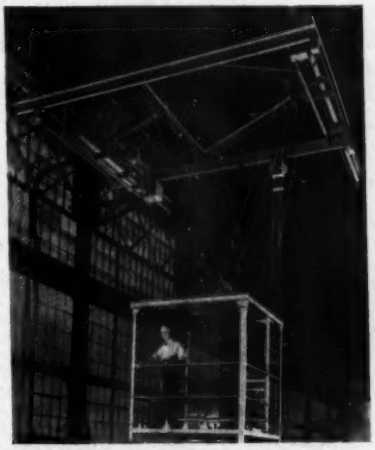
Every time the indexed wheel stops, the rotating flare-tool, conveniently situated in front of the passing tubes, is instantly pushed forward by means of a lever and timed cam, and performs the required flaring operation on the tubes, pictorially shown in Fig. A and B—Thereafter, the flared tube is automatically picked out from the slot and transferred through the chute to the annealer. The flares are kept rotating while being annealed and burnished in this gas heated oven to prevent cracking. From there the finished glass tubes are automatically delivered into the container.

All the operator has to do is to fill the hopper up for approximately 15 to 20 minutes run—and if the machine is combined with a glass cutter, as shown in the small illustration—to cut the tubing to the required tube length.

This horizontal Automatic Flare Machine for large quantity work in soft and hard glass, is supplied with ¼ HP motor and adaptable for miniature vacuum, gas filled incandescent lamps and radio tubes and can be arranged for the following gas combinations: Illuminating gas and air, illuminating gas, air and oxygen, hydrogen and oxygen.

The production varies between 1200 to 1800 per hour, depending upon the size and diameter of the tube. Shrinkage is of absolute negligible minimum. Required gas pressure 13 inches water column, air pressure 2-3 lbs. per square inch, net weight about 900 pounds.

The continuous annealer and especially the adaptation of the cutter make this machine a very compact and efficient high speed unit, which also can be suitably used for manufacturing similar glass articles that heretofore have been performed by hand.



STABILIZED TRAVELING PLATFORM

The Cleveland Tramrail Division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio, has developed a new Stabilized Traveling Platform that can be raised or lowered without swing as firmly as though held by verticle guides. It can be traveled to any point longitudinally or laterally in an area covered by the crane on which it is operated.

Besides the usual upper limit switch for preventing the platform being hoisted beyond the upper limit, an important feature provided to aid safety when lowering, is the slack cable release. Through means of this feature, the platform is stopped immediately when lowering if any part of it comes in contact with any object sufficiently to cause slackening in any of the hoisting ropes.

The unit illustrated is of the all-welded steel construction. It will carry a load of 5 tons and has a hoisting speed of 18 f.p.m. This type of stabilized platform is suitable for operation through a verticle height up to 30 ft. and may be furnished for operation at any hoisting speed from creeping to 50 f.p.m., or more.

METALLIZING GUN SPRAYS AT RECORD SPEEDS

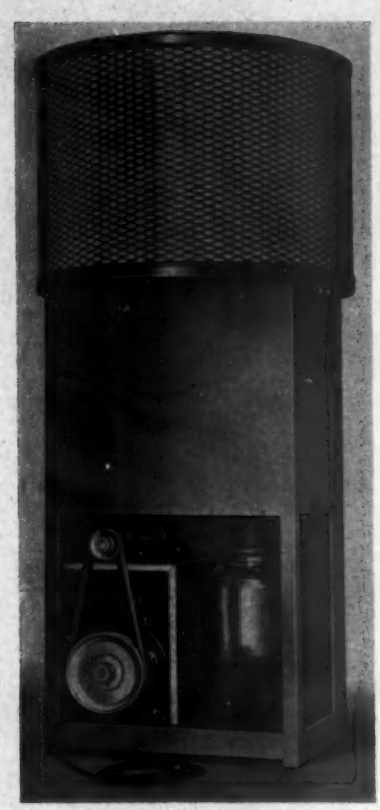
Metallizing Engineering Co., Inc., has announced the introduction of the METCO Type 3E metallizing gun—especially engineered for the high speed production spraying of low melting point metals.

Applications where this gun will cut costs and broaden opportunities for spraying low melting point metals on a production basis include: corrosion-resistant coatings on iron and steel structures and equipment; water- and chemical-resistant linings for storage tanks and degreasers; conductive and soldering surfaces on glass, plastics, and carbon products.

NEW LINE OF WEIGHING SCALES OFFERED

The Howe Scale Company, Rutland, Vermont, has announced a complete new line of predetermined weighing scales to further aid manufacturers in the production of high quality products at low cost and in packaging of goods to meet exacting weight and size specifications. In addition to packaging, these scales can be used for check-weighing, balancing, counting and compounding.

The models offered cover a variety of shapes, capacities and commodity platter sizes to meet a wide range of requirements. The scale illustrated has a capacity of 11 pounds and a 9″ x 9″ commodity platter.



DUST COLLECTOR AVAILABLE FOR 25 OR 50 CYCLE CURRENT

The Aget-Detroit Company of Ann Arbor, Michigan, has added an entirely self-contained portable Dustkop dust collector built especially for operation on either 25 or 50 cycle frequency, alternating current, to its line of portable industrial dust collectors. Aside from the difference in frequency this unit employs the same cyclone separator and filter combination as the standard Model 950 Dustkop dust collector.

Since it is portable and entirely self-contained, the new Dustkop dust collector eliminates the necessity for costly duct work and it is not to be connected into a centralized system. Available with either one or two inlets, as required, the Dustkop can be quickly connected up to the source of the dust by means of standard size flexible metal hose or sheet metal pipe.

TABLE-TYPE PRINT DRYERS

Peck and Harvy, Chicago, has produced a compact, electrically heated dryer for "overall drying" of blue prints or black and white prints. This dryer comes in two sizes—handling prints of 25 in. and 44 in. widths.

This unit is also equipped with variable speed drive motors and controllers which permit instantaneous speed changes over a range of 6 in. to 3½ ft. a minute. Some of the other features incorporated in the dryer are: pressed steel framework, specially woven seamless band, seamless copper revolving drum, steel-clad, refractory insulated, Nichrome heaters, nickel contacts, and asbestos insulated nickel wire.

IMPROVED STEEL SAFETY MAT

New improved steel safety mats, manufactured by the Wm. F. Klemp Company, include a design feature which has proved a decided addition to non-skid protection. This is a slight crimp or center bend in one side of the strong steel mesh.

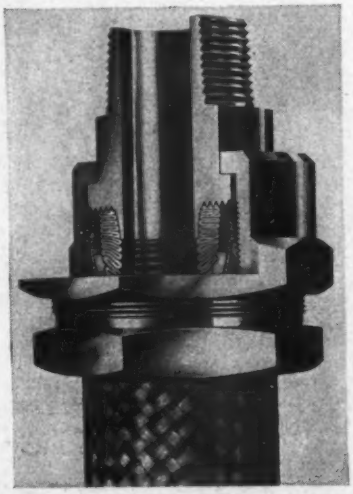
These steel mats roll up like a rug and can be placed wherever men are working at machines and equipment. They prevent slipping and falls, keep feet dry, reduce fatigue and prevent accidents. They are made any length up to 25 feet, any width to 6 feet and larger areas can be covered by joining multiples without special tools.

COUPLING FOR FLEXIBLE METAL HOSE

The Packless Metal Products Corp. has developed a detachable brass coupling for helical flexible metal hose in sizes from 3/4 in. to 1½ in. I.D. This unit offers the advantage of being mechanically self-sealing.

The unit consists of four parts—the nut, back, stem and split ring. When assembled the convolutions of hose and the metal braid are securely held by pressure between the members as shown in the accompanying cut-away view.

The coupling withstands pressure tests of up to 800 pounds.



CATALOGUES RECEIVED

Wickwire Spencer Steel Company, New York, N. Y., has designed and produced an interesting two-color booklet, "Let's Take a Tour with Wick and Spen." It starts with a story of how Wickwire Spencer products are used throughout the day and night of the average American. Following this is an alphabetical listing of the company's products.

General Electric Co., Schenectady, N. Y., has recently issued bulletin CR 7511-A, called "Electronic Relay," which describes and gives the operation and application of this electronic relay in industrial plants. The booklet is illustrated with photographs and diagrams of the mechanism.

The Farvel Corporation, Cleveland, Ohio, is distributing a brochure explaining the Farvel Centralized Lubricating Systems. Elimination of the hazards due to manual lubrication of hard-to-get-at bearings is the subject of this illustrated bulletin, issued under the title, "Aloft Is No Place for A.W.O.L."

The Youngstown Miller Co., Sandusky, Ohio, announces that Bulletin YM-700, covering their new Robot Oil Reclaimer, is now available. The units described in this bulletin are capable of restoring lubricating, hydraulic, cutting and vacuum pump oils so that the reclaimed oil can be re-used in the same manner as new oil.

Sullivan Machinery Company, Michigan City, Ind., is offering a new 56-page two color bulletin (A-52) describing their line of heavy duty two-stage air-cooled compressors for industrial plants, etc. The well illustrated bulletin shows installations; gives description of available sizes, types and drives and of construction detail; also information as to foundation requirements, regulation, accessories and servicing.

Powermatic Ventilator Co., Cleveland, Ohio, has issued an attractive broadside on Ventilation describing their new Iron Lung ventilator unit, for industrial plants, as to construction, installation and operation.

General Electric, Schenectady, N. Y., is offering an attractively bound 76-page book on "Electric Furnaces." The book is fully illustrated with photographs and diagrams of the different furnaces and detailed information is given as to the application of each. This is their catalogue GEA-4049.

CATALOGUE & BULLETIN SERVICE

Current catalogues and manufacturers' service bulletins received in this department may be obtained by writing to THE GLASS INDUSTRY.

MELLON INSTITUTE ANNOUNCES APPOINTMENT OF DR. HAROLD E. SIMPSON

Dr. Harold E. Simpson has been appointed to the incumbency of an Industrial Fellowship in the Mellon Institute, Pittsburgh, Pa., whose program of research and development will be sustained by the Mississippi Glass Company, the President of which is Dr. J. C. Hostetter. The investigations of the Fellowship will be concerned with rolled or drawn glass, plain or wired, used principally for fenestration and for other structural purposes, and methods of finishing and decorating such glass.

Dr. Simpson has been connected with the Institute for eight years and is well known professionally for his research accomplishments in ceramics. He has been especially active on committees of the American Society for Testing Materials and American Ceramic Society. Inasmuch as the products of the Mississippi Glass Company are of particular value in building construction Dr. Simpson's long experience on structural materials makes him unusually well qualified for heading this new undertaking.

Before going to the Mellon Institute in 1936 Dr. Simpson was engaged in research at the Battelle Memorial eral offices in Lancaster, Ohio.

TWO NEW APPOINTMENTS MADE BY ANCHOR HOCKING

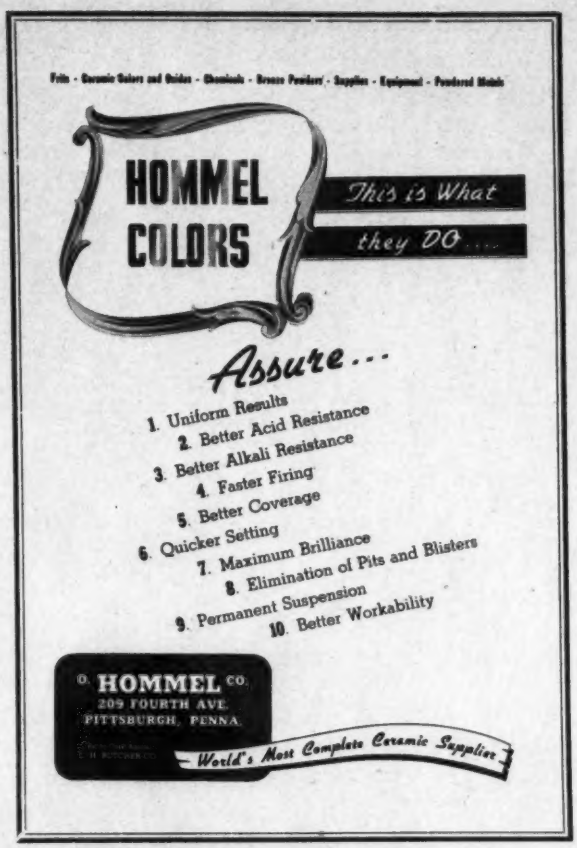
The Anchor Hocking Glass Corporation has announced the appointment of Paul L. Hershfield as General Factories Manager of the corporation's glass container plants. Mr. Hershfield has been with this organization since 1931 and was formerly manager of the corporation's Salem, N. J., plant. His new headquarters will be at the general offices in Lancaster, Ohio.

The second appointment was that of James J. Glynn as Sales Manager of the corporation's Pacific Coast operations—the Pacific Coast Closure Division of the Anchor Hocking Glass Corporation and the Maywood Glass Company, both of Los Angeles, California. Mr. Glynn has also been associated with this company since 1931 and was formerly Manager of Production Control. His headquarters will be in Los Angeles.

RESIDUAL FUEL OILS AVAILABLE TO GLASS INDUSTRY

It has recently been brought to the attention of THE GLASS INDUSTRY that the Petroleum Administration for War has ruled that only residual fuel oils will be available to the glass industry for melting glass. No distillate fuel oils will be allowed for that purpose.

Therefore, all requests for fuel oil should be made only for the residual oils No. 5, No. 6, and Bunker C, until further notice.



EISLER
ELECTRONICS
LABORATORY
EQUIPMENT
This electronic tube making unit fills the needs of schools, colleges, experimental and research laboratories for a compact machine complete in itself and capable of performing all operations required in the construction of incandescent lamps, radio tubes, electronic tubes and similar devices.
EQUIPMENT TO MAKE
ELECTRONIC TUBES
INCANDESCENT LAMPS
VACUUM SWITCHES
RADIO TUBES
NEON TUBES
PHOTO ELECTRIC CELLS
WRITE FOR CATALOG No. 43-B
CHAS. EISLER
EISLER ENGINEERING CO.
742 SO 13th ST. NEWARK 3, N. J.

INVENTIONS AND INVENTORS . . .

(*Continued from page* 317)

vice utilizing glass cloth in filtering dust-laden air, and 2,348,182 to Games Slayter for apparatus for producing crimped fibers. The fiber is flowed through a pair of intermeshing gear-shaped elements driven by individual synchronous motors with facilities for moving either gear in or out of meshing relationship.

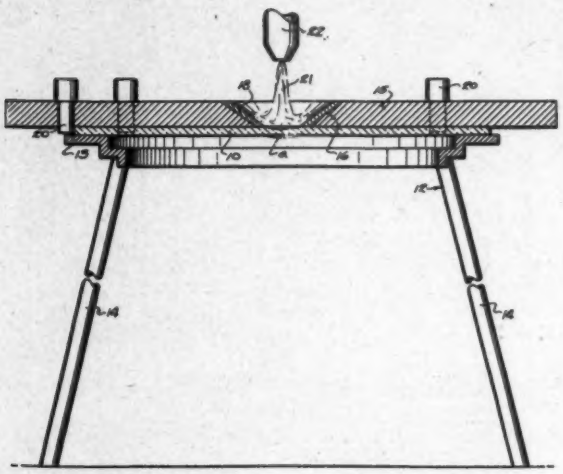


Fig. 4. 2,348,905 : Hopfield. Production of "bull's eye" glass from cold plates.

PRIORITY REFERRAL PLAN . . .

(*Continued from page* 315)

working with the WMC and USES in connection with the new referral plan. Personnel managers or those directly responsible for employment should get acquainted with local WMC and USES officers in their respective areas. This is of utmost importance since it should be borne in mind that the Plan is not a national one but is simply a promulgation of national principles laid down for the WMC, USES and the Manpower Priorities Committees to interpret as they see fit.

Further, be sure that your employment and personnel departments understand the requirements of the new rules beginning with July 1st.

Submit to your WMC area director all of the essential information you can about your work and your present and prospective manpower needs. Then ask him to tell you your company's priority status within the area. He will be assisted in this by the local area Manpower Priorities Committee referred to above.

This Priority Referral Plan functions very similar to the way in which the local draft boards operate. Each community (area) is regulated by its local committee through the USES local office. The committee and local area WMC officers are governed by national principles but they are allowed considerable latitude in interpreting them. It is most essential then that you make sure that your local WMC and WPB officials understand your situation and the importance of your factory and its products, both to the local and national economy.

The right of appeal is safeguarded for both employer and employee. A statement in this connection to the field concludes with this declaration: "Any person who claims that any action taken, action denied, or decision rendered with respect to him, with respect to his employer or with respect to any of his workers under a priority referral program, is unfair or unreasonable as applied to him or is inconsistent with these or other applicable policies and standards or with applicable regulations or programs, may appeal from such action or decision in accordance with War Manpower Commission Regulation No. 5." The regulation states that all appeals should be made to the WMC area director in writing.

Penalties covering both employers and employees for violation of the Priority Referral Plan for Labor are as follows:

1. There is a fine up to $1,000 and/or a year's imprisonment for both the employer and employee. Also. the entire salary paid may be disallowed as an income tax reduction; 2. The War Manpower Commission area authority may give a Statement of Availability to all of your employees; 3. WMC may cooperate with WPB by invoking sanctions against the violating employer, such as denial of priorities of material, denial of contracts, etc.

Following is a list of labor areas by states in which glass factories are most generally located. The address of the area WMC office can be ascertained from the telephone book or from the nearest WPB district office.

Connecticut
- Meriden area—Meriden.

Indiana
- Marion area—Marion, Gas City and others.
- Muncie area—Dunkirk, Hartford and others.

Maryland
- Cumberland area—Cumberland and others.

New Jersey
- Bridgeton area—Bridgeton, Millville, Vineland and others.

New York
- Elmira area—Corning and others.
- Buffalo—Niagara Falls area—Buffalo and others.

New York Metropolitan Region
- Brooklyn—New York proper—Long Island City.

Ohio
- Columbus area—City of Columbus, Lancaster and others.
- Fostoria-Findlay-Tiffin area—Fostoria, Tiffin and others.
- Toledo area—Ohio-Michigan—City of Toledo and others.

Oklahoma
- Muskogee area—Okmulgee and others.
- Tulsa area—Sapulpa.

Pennsylvania
- Pittsburgh area—Coraopolis, Mt. Pleasant, Jeannette, Greensburg, Monaca and others.

West Virginia
- Charleston area—Dunbar, Charleston and others.
- Clarksburg-Fairmount-Morgantown area—Clarksburg, Fairmount, Grafton, Morgantown, Salem, Weston and others.
- Wheeling area—Bellaire, Ohio, Cameron, W. Va., Moundsville and Wheeling, W. Va.

Susie Smith becomes an artist!

Meyercord Decorative Decals enable production-line workers to decorate thousands of units — beautifully and uniformly — in the time formerly required by an artist to handpaint one. Meyercord Decal Decorations produce hand-painted effects . . . give your products that extra eye-appeal which assures extra buy-appeal . . . with mass-production economy. Obtainable in any design, size and colors. They're washable, durable, inexpensive and can be applied on any wood, metal, plastic or glass. Decorate *your* post-war products this modern Meyercord Decal way. Address all inquiries to Department 20-7.

Buy War Bonds . . . and Keep Them!

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SALES OFFICES IN PRINCIPAL CITIES

Decals

BOOK REVIEW

"CHEMICAL MACHINERY"

by Professor E. Raymond Riegel

Hundreds of requests for sources of information on the many types of machinery and equipment used in the chemical and process industries have convinced the author of the ever-growing need for a readable and comprehensive book in this field.

Professor Riegel's position in the Department of Chemistry at the University of Buffalo has enabled him to have access to all the information necessary in producing a work of such a wide scope. He presents in a readable, accurate manner, the details of construction, operating technique, capacity, and, where possible, the price of all leading types of process equipment. The text contains over 400 illustrations and diagrams.

This volume will be useful to chemical engineers, plant designers and general technical personnel throughout the industries, and is also designed to serve as a textbook for students of chemical and industrial engineering.

PERSONNEL CHANGES AT T. L. SMITH CO.

Announcement has been received that H. C. Peters, of the T. L. Smith Co., has been promoted to the position of Assistant to the President and Vice President in Charge of Engineering, Research and Development.

The new General Sales Manager for the company is Robert P. Bremner who, until recently, was District Manager in Milwaukee for the Petoskey Portland Cement Co.

L-O-F PLAYED LARGE PART IN CONSTRUCTION OF B-29 SUPER FORTRESS

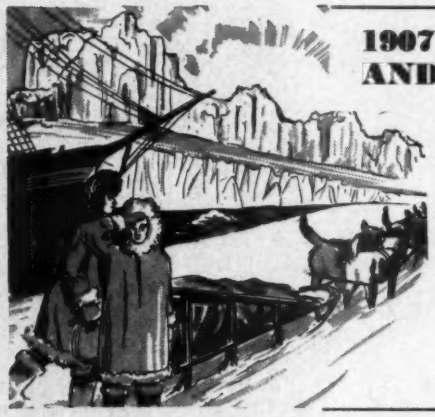
At the same time the Army announced that the giant new Boeing bomber had participated in the raids on the Japanese mainland, Libbey-Owens-Ford Glass Company engineers revealed that the revolutionary nose of the stratosphere "Jap-buster," made of eight sections of specially curved glass with plastic and metal, serves a double purpose. It acts as the windshield through which pilots actually will "sight" for lands, and provides a special sighting window for bombardiers.

The tail gunner of the bomber is protected from enemy fire by three sections of heavy bullet- and flak-resistant glass, one being placed in front of the gunner and the others installed on each side of his station. Removable panels of flak-resistant glass are inserted in front of both pilot and co-pilot when in combat.

DR. ZAY JEFFRIES NEW TRUSTEE OF BATTELLE INSTITUTE

Battelle Memorial Institute has announced the election, to its board of trustees, of Dr. Zay Jeffries, noted scientist and a pioneer in tungsten metallurgy and in the development of high-strength aluminum alloys.

Dr. Jeffries is technical director of the Lamp Department of General Electric Company, Cleveland, Ohio; chairman, Carboloy Company, Inc.; and vice chairman of the War Metallurgy Committee of the National Academy of Sciences and National Research Council.



1907 WAS A GREAT YEAR . . .
AND 1909 WAS A RECORD-BREAKING ONE

Robert E. Peary was the first to reach the North Pole . . . the S.S. Mauretania set a new trans-atlantic crossing record . . . Bleriot made the first air flight across the Channel . . . Orville Wright was breaking records for speed, sustained flight and altitude. Banner Lime, then on the market two years, was also making a record—setting a new mark of quality for purity and manufacturing perfection.

Essentially yours

Banner Lime

National Mortar and Supply Co.,
Grant Bldg. Pittsburgh, Pa.
Established 1907

In four essential industries: steel, glass, agriculture and building, lime and limestone are essential.

THE OTTAWA SILICA COMPANY

OTTAWA. ILLINOIS

ETERNAL AS THE SANDS OF TIME

The PRINCE of GLASS SANDS

The famous OTTAWA WHITE SAND

THREE PLANTS TO SERVE YOU

OPERATING YEAR AROUND

EVER NEW

CRYSTAL 98% PURE SILICA

COMPRESSED AIR EQUIPMENT . . .

(*Continued from page* 311)

gaskets as well. The following gasket materials are suitable for use on air compressors:

(a) Air valve seats—thin copper, soft annealed; copper covered asbestos; asbestos sheet (1/16 inch thick) for emergency or temporary use only.
(b) Valve covers—same as for valve seats.
(c) Cylinder headjoint—compressed asbestos sheet.
(d) Frame joints—plant fiber sheet.

Rubber gaskets should not be used as these deteriorate rapidly when subjected to oil and heat of compression. When replacing gaskets make sure that none of the air and water passages are obstructed by incorrectly cut gaskets. Gaskets used in air lines should be made of plant fiber. Asbestos packing will not last in air lines because of oil.

In order to determine the actual capacity of a compressor, special bulky and expensive equipment is required. A check of capacity may be made by the so-called "pump up" method. According to this method, the air delivered by the compressor is discharged into a closed tank of known capacity, the pressure rise in a given time is noted and temperatures at the beginning and end of the test are observed. From these data the weight of air pumped into the tank may be computed and can be expressed as volume delivered by the compressor per unit of time. It must be understood that the results obtained by this method are only approximate, due to the error in computing the volume of the tank and attached piping and to the difficulty of obtaining the true temperature within the tank. Within this limitation the test has a certain practical value.

If the compressor capacity falls off, the following possible causes should be investigated:

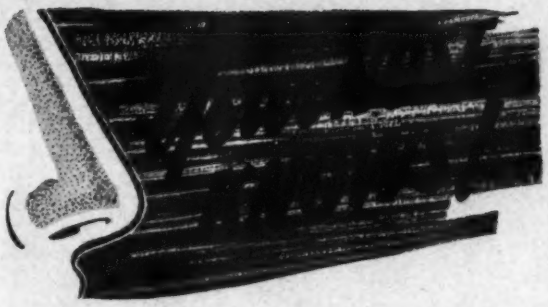
(a) Broken or leaky compressor valves.
(b) Restrictions in compressor intake.
(c) Broken or worn out piston rings.
(d) Excessive wear on cylinder liners.
(e) Leakage between stages. (See "c" and "d" above.)
(f) Leaky intercoolers or aftercoolers.
(g) Leakage through stuffing boxes.
(h) Clearances greater than normal, especially in first stage.
(i) Compressor not running at normal speed.

Indications of reduced capacity may be observed by:

(a) Air pulses back into intake caused by leaky or broken first-stage inlet valves.
(b) Stage pressures other than normal.
(c) Air temperatures rise above normal.
(d) Blowing of air into crankcase past piston rings.

DR. LITTLETON AWARDED HONORARY DEGREE

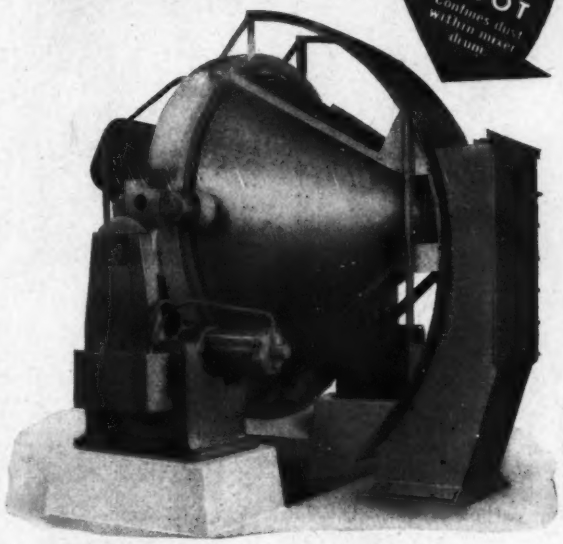
At the annual commencement exercises of the University of Wisconsin, Dr. Jesse T. Littleton, associate director of research of Corning Glass Works, was awarded the honorary degree of Doctor of Science in recognition of his contributions to the world's knowledge of glass.



You breathe pure, dust-free air in a batch room equipped with Smith Mixers. That's because the Smith is *dust-sealed during the entire cycle of operations* — charging, mixing and discharging. There's no chance for dust or vapor to escape. Eliminates silicosis hazard. Promotes employee health and efficiency, at the same time producing quality glass batches in the shortest possible mixing period.

Mix Your Glass Batches in a DUST SEALED SMITH MIXER!

DUST BOOT
Confines dust within mixer drum



The famous Smith duo-cone drum, with its scientific "end-to-center" mixing action, insures uniform batches, improved quality of glass and greater production. Built in all standard sizes up to 112 cu. ft. Ask for data.

The T. L. SMITH CO.
2898 NORTH 32nd STREET
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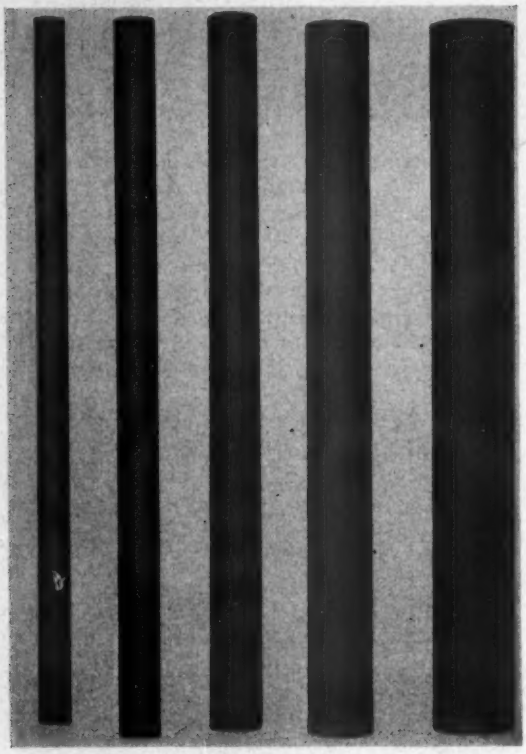
Malleable Iron Rods for plugging Moulds



3/16" 1/4" 5/16" 3/8" 1/2" 5/8" x 6"

IN the manufacture of Malleable Rods a "white iron" is produced Fe3C. The carbon is present in the combined form. The "white iron" castings are annealed or graphitized so that the final structure consists of ferrite (Fe) and free carbon (C) which is in the form of "temper" carbon.

This material is very soft and will pein readily.

Machinability

It is generally known, in commercial operations, Malleable iron machines more readily than other ferrous materials of equal tensile properties.

May we send you a descriptive booklet or answer questions on your specific problems?

Price of 15c *each F.O.B. Rockford*

GUNITE
FOUNDRIES CORPORATION
ROCKFORD ILLINOIS
Established 1854

RESEARCH DIGEST . . .

(*Continued from page* 318)

the furnace is greater than the heat loss due to leakages *from* the system and consequently the more of the system which can be kept under a positive pressure the better the results; (b) normally the whole system is not full of moving gases and the higher pressures have the effect of causing a more complete filling; resulting in lowered velocities and an increase in times of contact. 3—More careful attention to the adjustment of the proportion of the waste gases entering the gas and air regenerators.

Other subjects which were discussed included: ports and combustion space, waste heat boilers, furnace design and furnace efficiency.

REPORT OF ACTIVITIES 1943 KAISER WILHELM INSTITUTE FOR SILICATE RESEARCH

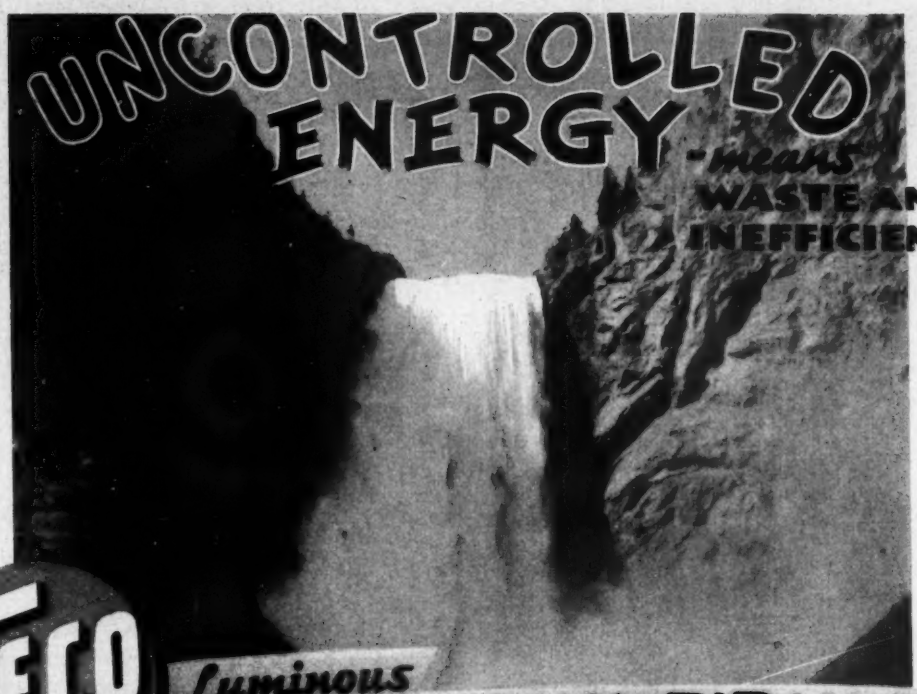
The following brief report of the activities for 1943 at the Kaiser Wilhelm Institute for Silicate Research is a translation from *Naturwissenschaften.*

In the KWIS (Prof. Eitel, dir.) war jobs prevailed during the period covered by this report. In pure research electron optics were successfully applied to the quantitative study of reactions. Investigations of the dehydration of talcum led to a better characterization of protoenstatite. In connection with dehydration experiments the metaphases of halloysite, brucite and kaolin were examined. It was shown that metakaolin cannot be considered as a specific anhydrous phase but represents a highly dispersed mixture of the free oxides. Further work on montmorillonite is under way. Recently additional knowledge was acquired on the solid reactions during firing of portland cement flour. The identification of the various reaction steps, however, was found difficult because of the host of phases appearing.

In the field of glass the study on constitution was continued on the basis of crystal chemistry. The expansion of silica glass and special glasses was interpreted. Resuming older investigations the Institute tested enamels containing B_2O_3, and free of B_2O_3. Slags of low iron ores were found to be valuable raw materials in the glass industry. Thermochemical measurements on cement clinkers were terminated. In the x-ray division model structures were applied to the structure of alkaline earth orthosilicates — covered by Tscheischwili's papers on beryllium fluorides. Problems of organic silicon compounds were attacked successfully.

Papers prepared for print by Dietzel are:

"Glass"—a chapter for Practical Raw Materials.
"Soda Slag"—*Sprechsaal.*
"Structural Chemistry of Glass"—*Glashutta Handbuch.*
"Opacification and Constitution"—*Glast. Ber.*
"Trivalent Cobalt in Highly Alkaline Glasses"—*Zs. Electrochem.*
"Striking of Ruby"—*Zs. Elektroch.*
"Rare Devitrifications"—*Glast. Ber.*
"Fine Structure of Glass: Glasses with Several Alkalis."
"Adherence of Enamel on Cast Iron."



TECO *Luminous Flame* TANK FIRING

prevents WASTE *and increases* EFFICIENCY

through CONTROL *of*

2 · LENGTH, SHAPE *and* POSITION *of* FLAME

The potential energy in many a plunging waterfall has been harnessed and utilized, with accruing benefits largely in proportion to the efficiency of control applied.

An example of exceptionally efficient energy utilization lies in the TECO Luminous Flame System of Tank Firing that not only generates an uncommonly efficient flame but controls it with remarkable results by an exclusive patented method.

The length, shape and position of flame are *regulated* by introducing "make-up" gas into the fuel gas with a blower whose intake is connected to the flue and to the atmosphere. The flame is *lengthened* or *shortened* as the proportion of inert gas to air is varied.

From every port, *under exact control,* flows a wide flat layer of incandescent burning gas—right on the surface of the glass and always stopping just short of the exit port. Complete combustion is obtained at all loads with *controlled* temperature all over the melting zone—with maximum penetration into the glass and a hotter bottom.

Write for descriptive literature and watch our advertisements which will explain other features of control.

TOLEDO ENGINEERING *Company*

GLASS MELTING *and* MANUFACTURING EQUIPMENT

EASTERN OFFICE 220 E. LEXINGTON ST. BALTIMORE MD. • • • 958 Wall St. TOLEDO, O.

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OWENS-CORNING FIBERGLAS EXPANDS EDUCATIONAL PROGRAM

Dr. Paul Edgar Williams, for the past ten years director of Jefferson College, St. Louis, has joined Owens-Corning Fiberglas Corporation as director of the company's newly-expanded educational program.

This program is an extension of a training plan that has been in effect in the Fiberglas factories for several years. It is designed both for new personnel assigned to positions of responsibility in sales, service, manufacturing, research and other departments, and for present employees holding similar positions who will benefit from a broadened understanding of company policies, and of products, markets and application requirements.

Dr. Williams brings to his new position a broad experience in the educational field and a first-hand knowledge of the personnel-training problems of industry. Before deciding upon a career in education he served as an employee of the Wheeling and Lake Erie Railroad and as a member of the personnel department of the Westinghouse Electric and Manufacturing Co.

WICKWIRE SPENCER PUBLISHES COLLECTION OF ILLUSTRATIONS BY ARTZYBASHEFF

The Wickwire Spencer Steel Company has, for the past two years, been using illustrations painted by Boris Artzybasheff in its advertising series. Into each illustration Artzybasheff has put "the brutishness of the Axis . . . its craven cowardice . . . its mounting terror as final defeat becomes more imminent."

Since the publication of the first advertisement containing one of these illustrations Wickwire Spencer has received hundreds of requests for reproductions. Therefore, in response to this increasing demand the company has published a striking booklet "Axis in Agony," incorporating therein the most popular of the Artzybasheff illustrations.

HARTFORD-EMPIRE REQUEST FOR REHEARING REFUSED BY SUPREME COURT

On June 9th the Hartford-Empire Company requested that the Supreme Court grant a rehearing on its decision of May 15th which set aside a Third Federal Circuit Court's finding that a disputed patent held by Hartford-Empire was valid. The Supreme Court refused to grant this rehearing.

The Supreme Court's decision was on an appeal by the Hazel-Atlas Glass Company, which contended that fraud was practiced on the lower court in that a magazine article dealing with the patent, and supposedly written by the man then president of the Flint Glass Workers' Union, in reality was written by attorneys for Hartford-Empire. In its opinion, the court quoted from this article in holding the patent valid.

O.P.A. APPROVES INCREASES IN INTER-INDUSTRY TRANSACTIONS

The Office of Price Administration has issued an amendment to MtP.R. 382, effective June 20, 1944, which will permit producing manufacturers of wide-mouth glass containers to increase ceiling prices in sales to other manufacturers, provided the latter agree to absorb the resulting increases. This action will make it possible for manufacturers who actually produce the articles to continue to serve other manufacturers who buy from the producer and resell the products under their own trade name.

It is also understood that the OPA will soon issue an amendment to M.P.R. 188, which regulation covers among other products all glass containers other than wide-mouth ware. The anticipated amendment will be similar in effect as regards prices in inter-industry transactions as they pertain to glass containers not covered by M.P.R. 382.

Increased production costs have made it impossible for some producers of glass containers to continue to sell to other manufacturers at present prices and discounts. Several glass container manufacturers had indicated a desire to be permitted to negotiate a price with producers above ceilings, with the understanding that the buyer would absorb the increases.

In answer to this request the OPA approved such transactions, providing the following conditions are met: (1) both seller and buyer must be "manufacturers" as defined in the amendment, and (2) any increase in price resulting from the agreement must be absorbed by the buying manufacturer and may not be reflected, directly or indirectly, in the resale price; nor may such increase be used as the basis for a request for an increase in price by way of an application for adjustment or petition for amendment.

PROMOTIONS ANNOUNCED BY WICKWIRE SPENCER STEEL

Recent announcements from the Wickwire Spencer Steel Company bring word of four promotions recently made in the company. R. T. Dunlap now holds the position of Vice President in Charge of Production and A. G. Bussmann has been advanced to the position of Assistant to the President.

Mr. Dunlap was previously Vice President and General Superintendent of the Buffalo District. Before joining Wickwire Spencer in 1943 he was General Works Manager of the Vulcan Iron Works at Wilkes-Barre, Pennsylvania.

Mr. Bussmann has previously been the Assistant to the Executive Vice President of Wickwire Spencer. He has been associated with the company since 1930.

Two other promotions within the company were those of B. L. McCarthy to the position of Assistant General Superintendent of the Buffalo Plant and C. A. Gordon to the position of Superintendent of Hot Departments at the same plant.

Mr. McCarthy was previously Chief Metallurgist of Wickwire and is well known as a chemist and for outstanding contributions to the study of steel metallurgy. Mr. Gordon has a long record in the steel industry for operating efficiency for open hearth and hot mill management.

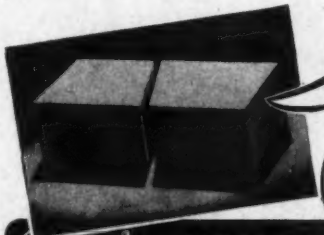
GLASS INSPECTION
with the *Polaroid*

Spectacle type polariscope

THE polarizing spectacle, mounted in unit with sensitive tint plate of 565 millimicrons, presents an absolutely uniform field of large aperture, strains showing up in sharply defined and correct colors.

Standard size apertures are 6" diameter and 12" diameter, and a rectangular size of 8" x 16"; but any special size to meet your requirement can be made. The 6" unit is suggested for either plant inspection uses or — as a portable unit for the trouble shooter or the salesman where a large aperture, compact unit of light weight is desirable.

The POLARIZING INSTRUMENT CO., Inc
1819 Broadway **New York City, 23**



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Yes... YOU CAN CUT SILICA BRICK IN 5 SECONDS WITH A CLIPPER MASONRY SAW

'TAILOR-MAKE' SPECIAL SIZES

THE SPEED AND ECONOMY IS AMAZING!

You can easily cut any masonry material with Clipper Masonry Saws . . . Clay, Concrete, Magnesite, Sillimanite or Acid Resistant Brick.

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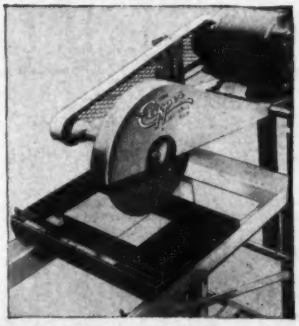

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